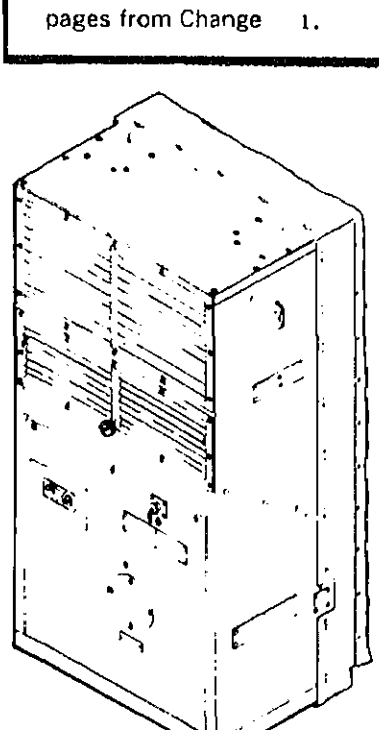
PERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

AIR CONDITIONER, VERTICAL COMPACT, 36,000 BTU/HR COOLING, 28,600 BTU/HR HEATING 208 VOLT, 3 PHASE, 400 HERTZ

KECO MODEL F36T4-2
NSN-4120-01-072-6388

This copy is a reprint which includes current pages from Change 1.



INTRO

OPERATING INSTR

OPE
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Operator's, Organizational, Direct Support
and General Support Maintenance Manual

AIR CONDITIONER, VERTICAL COMPACT, 36,000 BTU/HR COOLING,
28,600 BTU/HR HEATING 208 VOLT, 3 PHASE, 400 HERTZ

KECO MODEL F36T4-2, NSN 4120-01-072-6388

TM 5-4120-363-14, 7 November 1980, is changed as follows:

1. Remove and insert pages as indicated below. New or changed text mat
is indicated by a vertical bar in the margin. An illustration change is indi
by a miniature pointing hand.

Remove pages	Insert pages
i and ii	i and ii
1-3 and 1-4	1-3 and 1-4
2-9 and 2-10	2-9 and 2-10
4-17 and 4-18	4-17 and 4-18
4-19 through 4-22	4-22
A-1/A-2	A-1/A-2

2. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

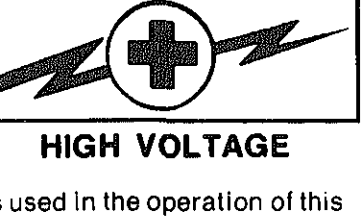
JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

R. L. DILWORTH
Brigadier General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25A, Operator's, Unit,
Direct Support and General Support Maintenance requirements for Air Conditior
Vertical Compact, 36,000 BTU Cool/28,600 BTU Heat, 208V, 400HZ, 3PH (F36T4-2)

WARNING



HIGH VOLTAGE

s used in the operation of this equipment
DEATH ON CONTACT
nay result if personnel fail to observe safety precautions.

ver work on electrical equipnt unless there is another pern nearby who is familiar with operation and hazards of the uipment and who is competent administering first aid. When technician is aided by operas, he must warn them about ngerous areas.

henever possible, the input wer supply to the equipment st be shut off before beging work on the equipment. rning the control panel switch OFF position does not disconct all power, as the input lines d compressor heater element still on. Take particular care ground every capacitor likely hold a dangerous potential. hen working inside the equipnt, after the power has been ned off, always ground every rt before touching it.

careful not to contact high-tage connections of 208 volts Input when installing or erating this equipment.

henever the nature of the eration permits, keep one nd away from the equipment reduce the hazard of current wing through vital organs of body.

not operate the equipment thout all grilles, guards, vers, and covers in place and

WARNING

DANGEROUS CHEMICAL

is used in this equipment
DEATH
or severe damage may result if personnel fail to observe safety precautions.

Use great care to avoid contact with liquid refrigerant or refrigerant gas being discharged under pressure. Sudden and irreversible tissue damage can result from freezing. Wear thermal protective gloves and a face protector or goggles in any situation where skin - eye - contact is possible.

Prevent contact of refrigerant gas with flame or hot surfaces. Heat causes the refrigerant to break down and form carbonyl chloride (phosgene), a highly toxic and corrosive gas.

WARNING

REFRIGERANT UNDER PRESSURE

is used in the operation of this equipment.
DEATH
or severe injury may result if you fail to observe safety precautions.

Never use a heating torch on any part that contains Refrigerant R-22.

Do not let liquid refrigerant touch you, and do not inhale refrigerant gas.

WARNING

be toxic. Use a well-ventil area, wear gloves, and away from sparks or flame.

WARNING

Clean parts in a well ventila area.

Avoid inhalation of solv fumes and prolonged expo of skin to cleaning solvent. W exposed skin thoroughly.

Dry cleaning solvent (Fed. S P-D-680) used to clean par potentially dangerous to per nel and property.

Do not use near open flam excessive heat. Flash poin solvent is 100°F to 138°F (38° 50°C).

Wear eye protection when b ing solvent from parts. Air p sure should not exceed 30 (2.1 kg/cm²).

WARNING

The burning of polyuretha foams is dangerous.

Due to the chemical compos of a polyurethane foam, fumes are released when burned or heated. If it is bu or heated indoors, such as ing a welding operation nea you should take care to vent the area thoroughly. An exh system like that of a paint s booth should be used.

Air-supplied respirators, proved by the National Inst for Occupational Safety Health or the US Bureau Mines, should be used fo welding in confined spaces in places where ventilatio

OPERATOR'S, ORGANIZATIONAL DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL FOR AIR CONDITIONER, VERTICAL, COMPACT 36,000 BTU/HR COOLING, 28,600 BTU/HR HEATING 208 VOLT, 3 PHASE, 400 HERTZ

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake or if you know of a way to improve the pro cedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, U.S. Army Troop Support Command, ATTN: AMSTR-MCTS, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798 A reply will be furnished directly to you.

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Section I.

GENERAL INFORMATION

SCOPE

his manual contains operational, servicing and maintenance information for use by operators an
rganizational, direct support and general support maintenance personnel. Specific categories of i
nation have been arranged in the following manner:

) Chapter 2 — Operating Instructions

2) Chapter 3 — Operator's Maintenance Instructions

3) Chapter 4 — Organizational Maintenance Instructions

4) Chapter 5 — Direct Support Maintenance Instructions

5) Chapter 6 — General Support Maintenance Instructions

6) Appendix A — References

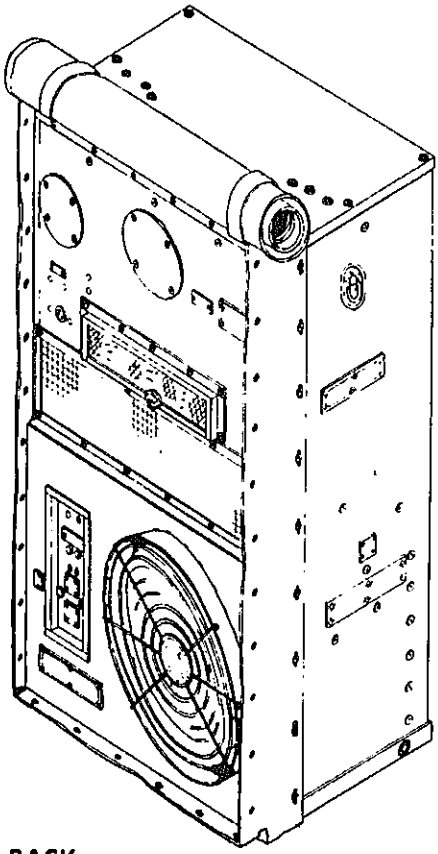
7) Appendix B — Components of End Items List

8) Appendix C — Expendable Supplies and Materials List

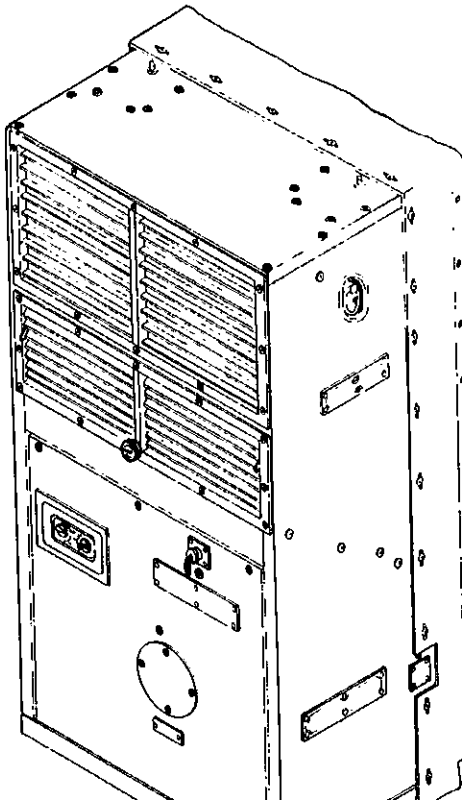
9) Appendix D — Maintenance Allocation Chart

NOTE

The complete Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools List is contained in TM 5-4120-363-24P.



BACK



in the room or enclosure in which it is installed.

d. The Model F36T4-2 is a self-contained unit with a capability of providing a maximum of 36,000 BTU/H cooling or 28,600 BTU/HR of heating.

-2. MAINTENANCE FORMS AND RECORDS

Department of the Army forms and procedures used for equipment maintenance wil se prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMM

Maintenance Forms and Records used by the Marine Corps' personnel are prescribed in TM-4700-15

-3. HAND RECEIPT MANUAL

Hand receipts for the End Item/Components of End Items (COEI), Basic Issue Ite II) and Additional Authorizations List (AAL) items are published in a Hand Re- ipt Manual. The Hand Receipt Manual numerical designation is the same as the r ted Technical Manual with the letters HR added to the number. These manuals ar blished to aid in property accountability and are available through: Commander S. Army Adjutant General Publications Center, 2800 Eastern Blvd., Baltimore, M 220-2896.

For Marine Corps' use refer to SL-1-3.

-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR'S)

f your Air Conditioner needs improvement, let us know. Send us an EIR. You, t r, are the only one who can tell us what you don't like about your equipment. know why you don't like the design. Tell us why a procedure is hard to perfor it on a SF 368 (Quality Deficiency Report). Mail it to us at Commander, Head rters, U.S. Army Troop Support Command, ATTN: AMSTR-QX, 4300 Goodfellow Boul d, St. Louis, Mo 63120-1798. We will send you a reply.

For Marine Corps' application use NAVMC form 10772 and mail to Commandant, Mar ps, Attention: LMA-1, Washington, D.C. 20380.

Section II.

EQUIPMENT DESCRIPTION

5. PURPOSE, CAPABILITIES, AND FEATURES

The Model F36T4-2 Air Conditioner is designed to circulate, filter, and cool or heat air in the roo enclosure in which it is installed.

The Model F36T4-2 has a capability of providing a maximum of 36,000 BTU/HR of cooling or 28 BTU/HR of heating. It is designed to automatically maintain the air in the room or enclosure a desired temperature selected on the control panel.

ntained in Chapter 4, "Organizational Maintenance Instructions."

ecial features include a provision for removing the control panel from the cabinet so that it may be l
alled in a remote location, and for introducing outside air through a chemical-biological-radiologic
BR) filter.

nen using this equipment in a secure area, caution must be exercised in meeting the establishe
ectromagnetic radiation standards. These standards may limit the use of the equipment's remo
pability and require additional shielding for the ducts.

LOCATION AND DESCRIPTION OF MAJOR COMPONENTS See figure 1-2.

ntrol Panel (1). Contains a 5-position mode selector switch and an INCREASE/DECREASE ter
rature control knob.

NOTE

The control panel is shown in its location when the air conditioner is installed as a self-contained unit. The control panel is designed so that it may be removed from the cabinet and installed in a remote location. When the control panel is removed, a block-off assembly is installed in this location.

put Power Receptacle (2). For connection of an external power source cable.

NOTE

The air conditioner is designed so that the input power receptacle may be used in the front panel location shown, or it may be moved to one of three alternative locations. Alternative locations are provided in each side panel and in the lower left hand corner of the back panel.

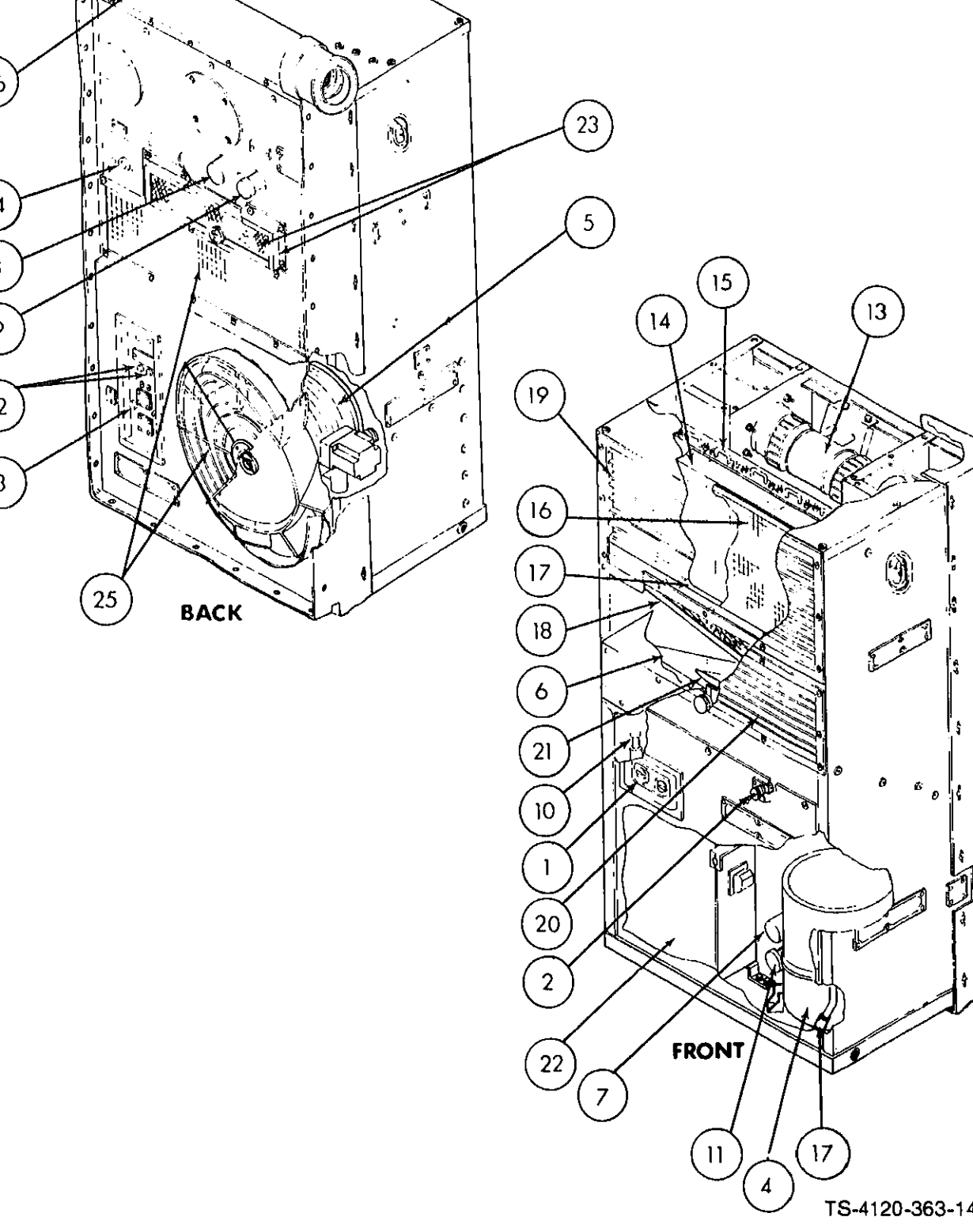
rcuit Breaker Reset Knob (3). Push-pull type for overload protection of electrical circuits. The circu
eaker is installed internally. The remote reset knob provides a means of resetting the circuit break
thout entering the cabinet.

mpressor (4). Consists of a reciprocating compressor driven by an electrical motor, hermetica
aled inside a steel container with a lifetime charge of oil. An external heater surrounds the lower part
e container. The purpose of the heater is to prevent possible damage to the compressor caused
uid refrigerant accumulation in the cylinders during a period of shut-down. The heater is connecte
ectly to input power and is thermostatically controlled to prevent overheating.

ndenser Fan and Motor (5). Draws outside air through the condenser coil and condenser/compress
ction and exhausts the heated air back to the atmosphere.

ndenser Coil (6). Made up of interconnected parallel copper tubes retained in a series of multipl
sely spaced aluminum fins. This coil serves as a heat exchanger to remove the heat from the com
essed refrigerant vapor so that it will condense into a liquid.

essure Equalizer Solenoid Valve (7). This valve is normally open when the compressor is NOT runnin
equalize the pressure at the suction and discharge sides of the compressor; it closes when the com
essor starts.



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Pressure Regulating Valve (10). This valve regulates the suction pressure by recirculating a part of the compressor discharge hot gas to the suction line when the suction pressure drops below a preset valve. This action prevents frosting of the evaporator coil. This valve also acts as a bypass valve in the cooling mode when the thermostate is satisfied.

Quench Valve (11). This is an expansion valve that meters liquid refrigerant into the suction line to the compressor to quench (cool) the hot, compressed vapors recirculated from the compressor discharge through the pressure regulating valve.

Pressure Cutout Switches (12). Preset high and low pressure cutout switches are connected through capillary tubes to the high and low pressure refrigerant lines respectively. If the high pressure exceeds the maximum or the low pressure falls below the minimum, the affected switch automatically turns off the compressor. Reset buttons are provided to return the system to operation.

Evaporator Fans and Motor (13). Draws room or enclosure air into the evaporator section and exhausts it through the heater elements and evaporator coil back into the room or enclosure.

Evaporator Coil (14). Similar in construction to the multiple-tube, finned condenser coil. This coil serves as a heat exchanger to absorb heat from the room or enclosure air circulated through the evaporator section.

Heater Elements (15). Consists of two banks of three elements each. Only one bank operates in the "LO HEAT" mode; both banks operate in the "HI HEAT" mode. One bank (Lo and Hi heat modes) is turned off when thermostat is satisfied.

Mist Eliminator (16). This is a thin filter located between the evaporator coil and evaporator discharge grille. Its purpose is to prevent condensate on the coil from being blown into the room or enclosure with the discharged air.

Condensate Drip Pan and Drain Trap (17). The drip pan is located directly below the evaporator coil and mist eliminator and is built into the casing. Its purpose is to collect condensate that may drip off the evaporator coil and mist eliminator during cooling operations. Collected condensate flows through built-in tubing to the drain trap which is located inside the lower right hand front corner of the cabinet. The drain trap is simply a check valve that prevents air flow between the condenser and evaporator sections through the drain tubing.

Conditioned Air Filter (18). Located inside the cabinet behind the evaporator intake grille to filter room or enclosure air as it is recirculated.

Evaporator Discharge Grille (19). Conditioned air is discharged through this grille. Adjustable louvers in the grille provide a means of limited directional control of discharge airflow.

Evaporator Intake Grille (20). Room air is drawn in through this grille. Adjustable louvers in the grille provide a means of controlling the amount of outside air introduced through the fresh air damper during operation.

Temperature Thermostat Sensing Bulb (21). Located in the airflow behind the evaporator intake grille to sense the temperature of the room or enclosure air drawn into the evaporator section of the air conditioner. This bulb is a part of the temperature thermostat control located in the control panel.

NOTE

mixed with recirculated room or enclosure air for ventilation.

. Sight Glass (24). Visually indicates the condition of the refrigerant flowing in the refrigerant lines cooling cycles when operating in the COOL mode.

. Condenser Intake Screen and Condenser Fan Guard (25). The intake screen prevents foreign matt entering the air intake to the condenser coil; the fan guard provides personnel protection from and ment damage to, the condenser fan.

. Fabric Cover (26). Provided for protection of the back of the cabinet from the elements when conditioner is not in use.

7. PERFORMANCE DATA

OPERATING TEMPERATURES	
LOW	-50°F (-45°C)
HIGH	+120°F (+49°C)
PERFORMANCE	
COOLING CAPACITY	36,000 Btu/hr
HEATING CAPACITY	28,600 Btu/hr
POWER REQUIRED	
VOLTAGE	208
PHASE	3
HERTZ	400
AMPERAGE	48
DIMENSIONS	
WIDTH	30.75 in. (78.1 cm)
DEPTH	21.50 in. (54.6 cm)
HEIGHT	55.25 in. (140.2 cm)
WEIGHT	440 pounds (199.6 kg)
REFRIGERANT	
TYPE	R-22

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Section I.

DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

1. GENERAL

he Model F36T4-2 Air Conditioner is designed for a wide variety of installations and for operation u e range of climatic conditions. It is also designed for continuous or intermittent operation as a sel ed unit or may be connected to external filtering equipment for operation under chemical-biolo ological (CBR) environmental conditions. Operators must be aware of any peculiarities or opera tations for their specific installation.

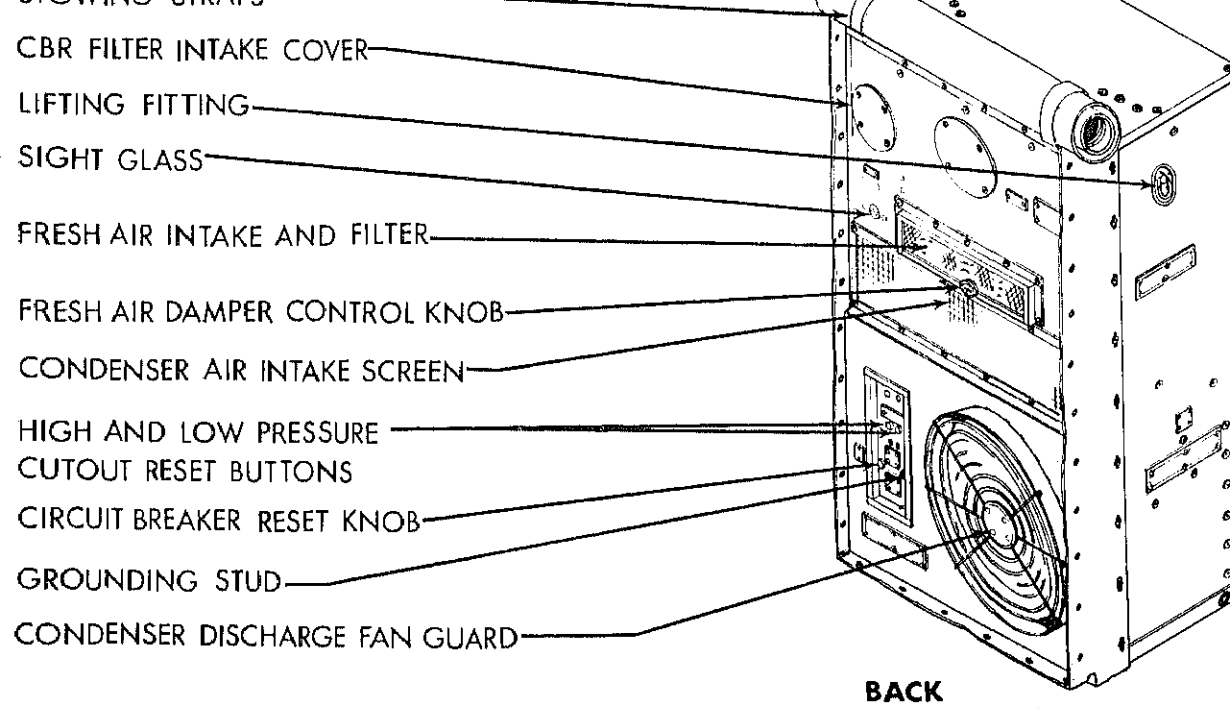
2. OPERATOR'S CONTROLS AND TECHNICAL PRINCIPLES OF OPERATION

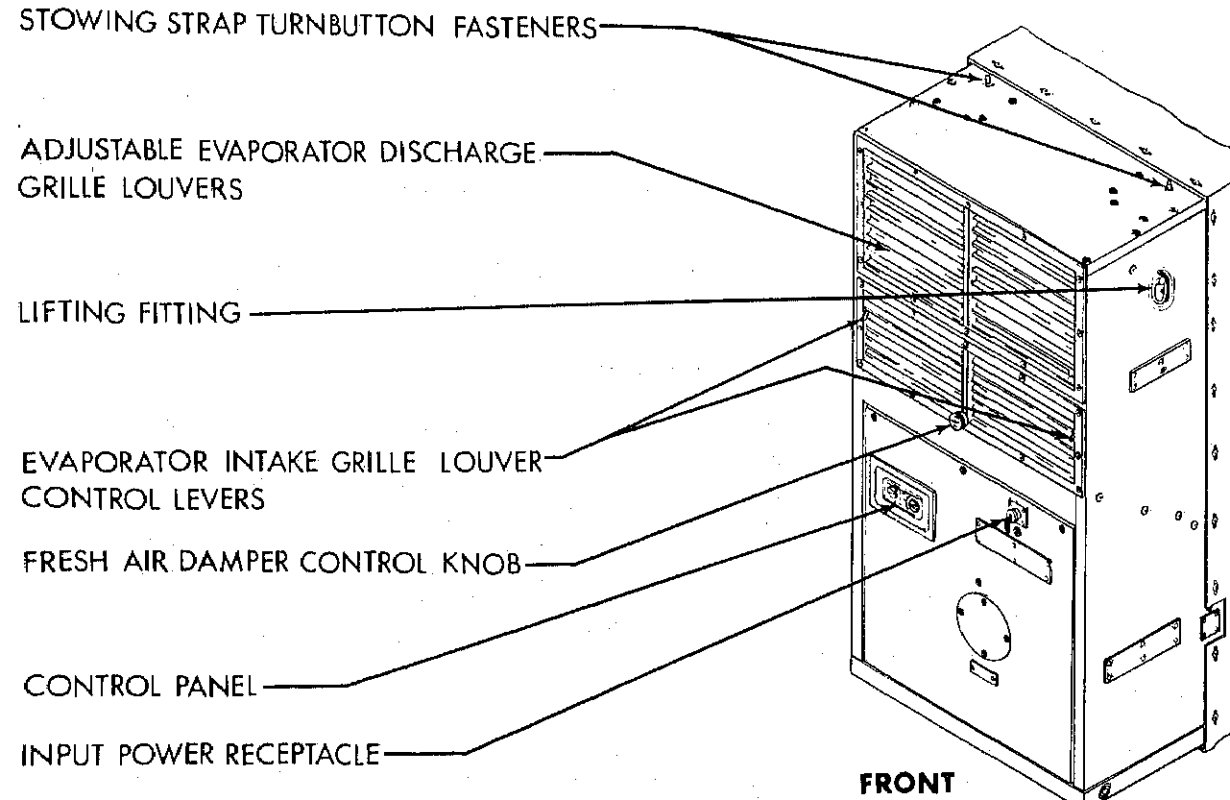
See figure 2-

CAUTION

Under normal operating conditions, before starting the air conditioner in any mode, make sure that the fabric cover on the back of the cabinet is rolled up and secured, that the condenser fan intake screen and fan guard are in place and unobstructed, and that the evaporator fan intake and discharge grille louvers are fully open. EXCEPTIONS: Under extreme climatic conditions, such as blowing snow, which might enter the compressor section, the unit may be operated in the VENTILATE, LO HEAT or HI HEAT mode with the fabric cover rolled down and snapped in place. When operated in this manner, outside air cannot be drawn through the fresh air damper, which should be positioned fully closed. The fabric cover cannot be rolled down if the unit is connected to a CBR filter. DO NOT OPERATE IN COOL MODE WITH THE FABRIC COVER ROLLED DOWN.

.. Control Panel. See figure 2-2. The control panel is located in the upper left hand corner of the lowe panel of the cabinet. This panel is designed so that it may be removed from the cabinet and installe remote location. (See para 4-6a.) The panel contains the following two operator controls:


CBR FILTER INTAKE COVER
LIFTING FITTING
SIGHT GLASS
FRESH AIR INTAKE AND FILTER
FRESH AIR DAMPER CONTROL KNOB
CONDENSER AIR INTAKE SCREEN
HIGH AND LOW PRESSURE CUTOUT RESET BUTTONS
CIRCUIT BREAKER RESET KNOB
GROUNDING STUD
CONDENSER DISCHARGE FAN GUARD
BACK


STOWING STRAP TURNBUTTON FASTENERS
ADJUSTABLE EVAPORATOR DISCHARGE GRILLE LOUVERS
LIFTING FITTING
EVAPORATOR INTAKE GRILLE LOUVER CONTROL LEVERS
FRESH AIR DAMPER CONTROL KNOB
CONTROL PANEL
INPUT POWER RECEPTACLE
FRONT

as follows: HI HEAT, LO HEAT, OFF, VENTILATE, and COOL.

(a) OFF Mode. In this mode, power to all components except the compressor heating element is turned off. This mode should be used for shut down periods rather than an external input power disconnect.

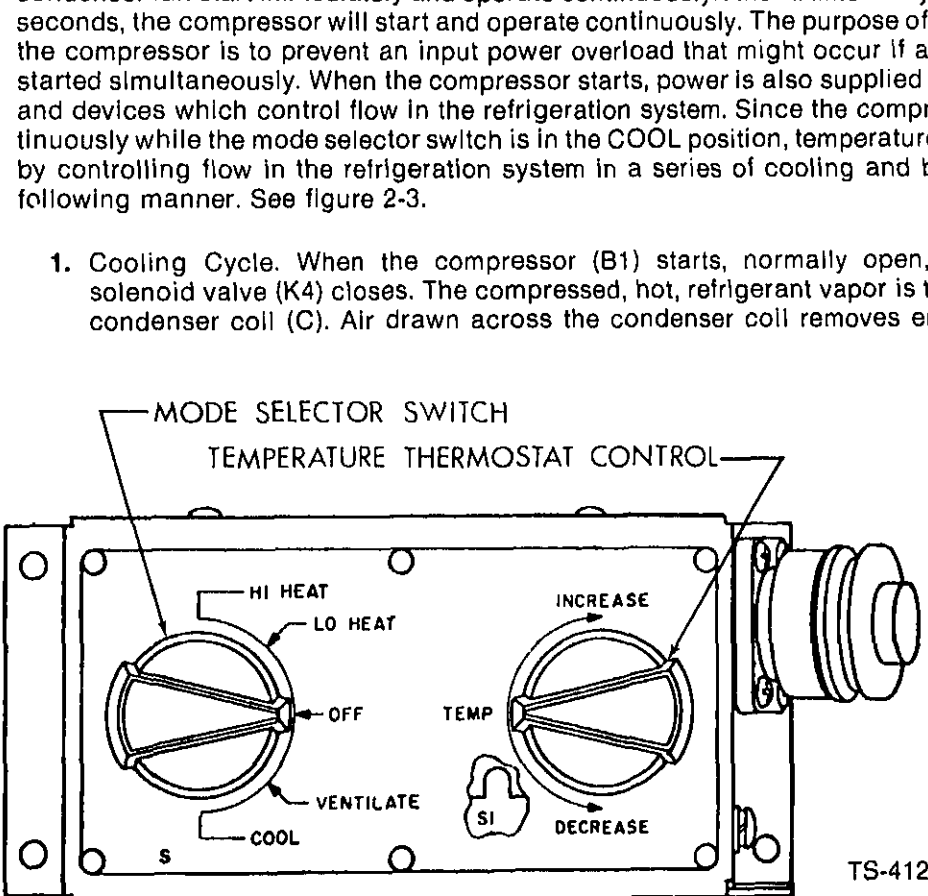
CAUTION

The purpose of the compressor heating element is to prevent possible damage to the compressor through accumulation of liquid refrigerant in the cylinders during a shut-down period. If all input power to the cabinet is removed for a shut-down period of more than a few minutes, it must be restored for an appropriate period before the air conditioner is started in the COOL mode.

(b) VENTILATE Mode. When the selector switch is placed in the VENTILATE position, the evaporator fan will operate continuously. Room or enclosure air will be drawn in through the evaporator intake grille and returned to the room or enclosure through the evaporator discharge grille. A portion of outside air can be admitted to the evaporator section through the fresh air damper or the CBR filter (if installed).

(c) COOL Mode. When the selector switch is placed in the COOL position, the evaporator fan and condenser fan start immediately and operate continuously. After a time delay of approximately 30 seconds, the compressor will start and operate continuously. The purpose of the delay in starting the compressor is to prevent an input power overload that might occur if all three motors were started simultaneously. When the compressor starts, power is also supplied to the various relays and devices which control flow in the refrigeration system. Since the compressor operates continuously while the mode selector switch is in the COOL position, temperature control is achieved by controlling flow in the refrigeration system in a series of cooling and bypass cycles in the following manner. See figure 2-3.

1. Cooling Cycle. When the compressor (B1) starts, normally open, pressure equalize solenoid valve (K4) closes. The compressed, hot, refrigerant vapor is then pumped into the condenser coil (C). Air drawn across the condenser coil removes enough heat from the



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at a reduced pressure. The refrigerant flow rate through the evaporator is controlled by the sensing bulb connected to V5. The cool air is discharged into the room or enclosure being conditioned. The refrigerant vapor from the outlet of the evaporator flows through the suction line to the vacuum side of the compressor. High-pressure cutout switch (S5) and low-pressure cutout switch (S6) provide protection by turning off the compressor in the event pressure at the discharge side becomes too high or pressure at the vacuum side becomes too low.

2. Bypass cycle. When the conditioned space is cooled to the setting of the thermostat control, the refrigerant system is automatically changed to bypass cycle. The compressor (B1) continues to operate but the liquid solenoid (K3) is closed which causes the suction pressure to decrease. When the suction pressure decreases to the setting of the pressure regulating valve (V2), V2 opens to maintain the minimum required suction pressure. The compressor superheat is controlled by expansion valve V4 to prevent the compressor from overheating during bypass cycle. There is no refrigerant flow through the sight glass during bypass cycle.

(d) LO HEAT Mode. When the selector switch is placed in the LO HEAT position, the evaporator fan will operate continuously. Power is also supplied to the relays and devices which control and operate the temperature thermostat controlled bank of three heating elements. The actual operation of the heating elements is then controlled by the temperature thermostat control.

(e) HI HEAT Mode. When the selector switch is placed in the HI HEAT position, the evaporator fan and an uncontrolled bank of three heater elements will operate continuously. Power is also supplied to the relays and devices which control and operate the temperature thermostat controlled bank of three heating elements. The actual operation of the controlled bank of heating elements is then controlled by the temperature thermostat control.

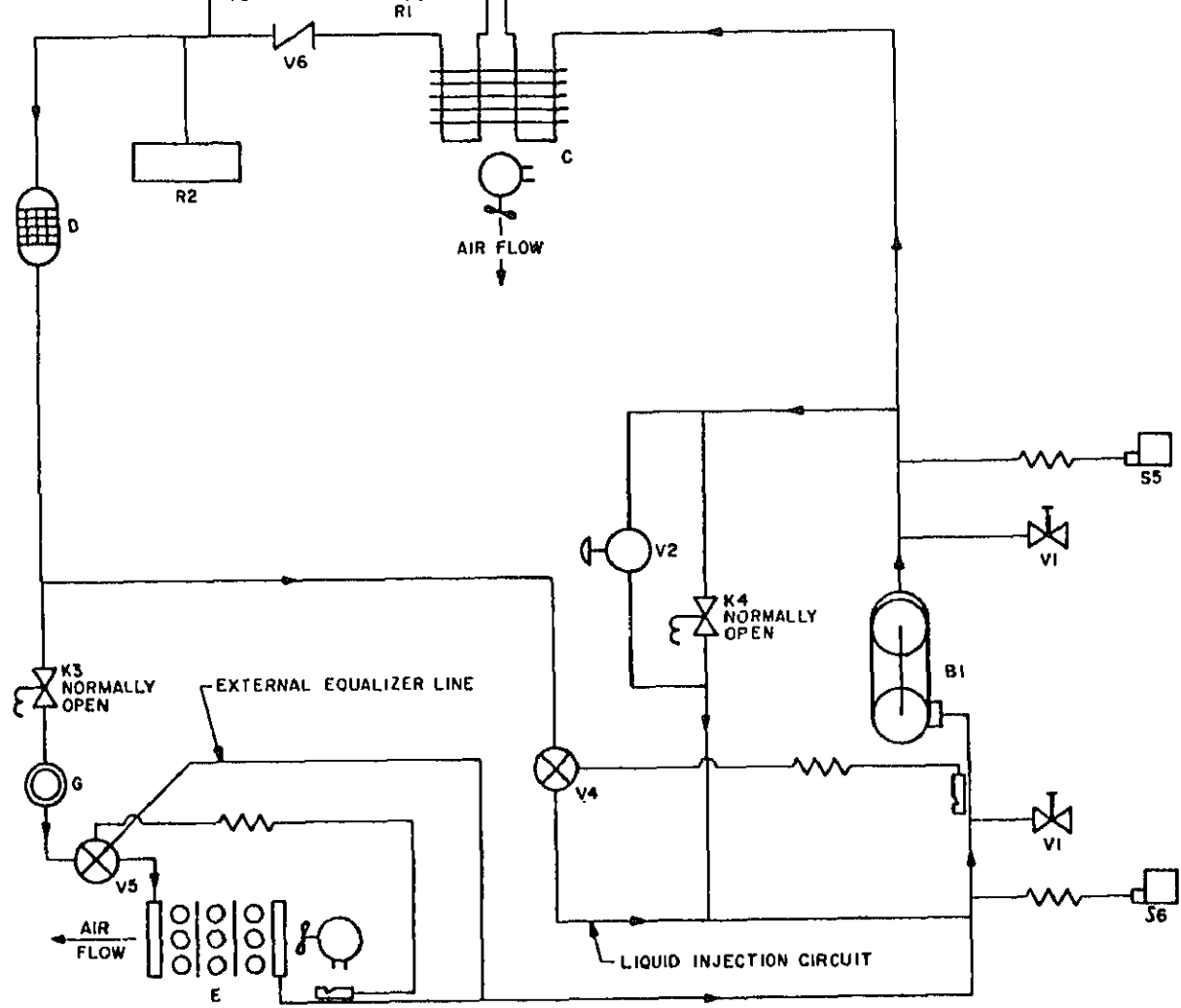
NOTE

An overheat thermostat located in the evaporator section directly behind the heating elements will turn off all heating elements in either LO HEAT or HI HEAT mode if the temperature in the cabinet reaches an excessive level.

) Temperature Thermostat Control. This temperature operated manually set, single-pole, switch is located on the right hand side of the control panel. The control panel is marked TEMP, at the horizontal center position of the pointer and INCREASE and DECREASE in clockwise and counterclockwise directions respectively. The temperature thermostat has an effective control range between 40°F and 90°F (5°C and 32°C). The centered position of the control knob represents an air temperature at the sensing bulb of approximately 65°F (18°C); fully clockwise 90°F (32°C); and fully counterclockwise 40°F (5°C). The single-pole switch opens or closes on a 1-1/2°F (1°C) temperature span in relation to the position of the control knob. When the control panel is mounted in the cabinet, the temperature sensing bulb is mounted in the air flow behind the evaporator intake grille. When the control panel is remotely located, the bulb is attached to the back side of the panel. The temperature thermostat control is disengaged in the OFF and VENTILATE modes. It functions as follows in the COOL and LO or HI HEAT modes:

(a) COOL Mode. In this mode, the switch in the temperature thermostat control operates the liquid flow solenoid valve (K3) in the refrigeration system. See figure 2-3. When the air temperature rises above the set point, the switch opens the solenoid valve and the refrigeration system goes into a cooling cycle. When the air temperature drops below the set point, the switch closes the solenoid valve and the refrigeration system goes into a bypass cycle.

(b) LO HEAT or HI HEAT Mode. The temperature thermostat control operates the same in either LO



LEGEND		
SYMBOL	PART NO.	DESCRIPTION
B1	13217E6796	COMPRESSOR, RECIP, PDVN
C	13217E6830	COIL, CONDENSER
D	13214E4209	DEHYDRATOR, DESICCANT
E	13214E3983	COIL, EVAPORATOR
G	13214E3969	INDICATOR, SIGHT, LIQUID
K3, K4	13214E3971	VALVE, SOLENOID
R1	13214E4028	RECEIVER
R2	13214E3876	TANK
S5	13211E8404	SWITCH, HIGH PRESSURE CUTOUT
S6	13214E4309	SWITCH, LOW PRESSURE CUTOUT
V1	13219E2828	VALVE, ANGLE
V2	13211E3800	VALVE, PRESSURE REGULATING
V3	13211E8369	VALVE, PRESSURE RELIEF
V4	13214E3974	VALVE, EXPANSION
V5	13214E4037	VALVE, EXPANSION

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(Airflow Controls. See figure 2-1. Airflow is controlled by the proper adjustment of the louvers in the evaporator intake and discharge grilles and the fresh air damper or, when installed, external chemical-biological-radiological (CBR) filtering equipment.

NOTE

Under normal operating conditions, it is desirable to introduce about 10 percent of outside air into the room or enclosure during the recirculation cycle. This will create a slight overpressure within the room or enclosure for more efficient environmental control, will provide replacement oxygen, and will eliminate the musty odors associated with stale air. Recirculation of room or enclosure air exclusively should be used only in extreme weather conditions or when rapid heating or cooling is desirable at air conditioner start-up.

(1) Evaporator Intake Grille. The intake grille is constructed in two sections of louvers (left hand and right hand). All the louvers in each section are connected together internally and attached to a single control lever. For operation in any mode, when room or enclosure air exclusively is to be recirculated, the louvers in both sections should be fully open to allow maximum air flow. For operation in any mode, when a portion of fresh outside air, or CBR filtered air, is to be admitted, the louvers should be adjusted partially closed to assist in the control of the volume of air admitted through the fresh air damper or CBR filter.

(2) Evaporator Discharge Grille. The discharge grille is also constructed in two sections of louvers. Each individual louver is independently adjustable to provide control of the direction of the flow of conditioned air back into the room or enclosure. They should never be closed to a point that will restrict the air flow.

NOTE

Cool air is denser than warm air, so it tends to sink downward; therefore, it is usually desirable to direct cool air slightly upward and warm air slightly downward for maximum distribution and comfort.

(3) Fresh Air Damper. Fresh air outside is admitted into the evaporator section through a filter mounted in a rectangular opening in the center of the rear of the cabinet. The volume of air admitted is controlled by an adjustable damper plate inside the cabinet, directly behind the filter. The position of the damper can be adjusted from either the front or back of the unit. The front control knob is located directly below the center of the evaporator intake grille. The back control knob is located directly below the center of the fresh air filter frame. Clockwise rotation of the front knob opens the damper; counterclockwise closes it. Rotation of the back knob is reversed, that is, counterclockwise to open; clockwise to close. Adjustment of the fresh air damper and the louvers in the evaporator intake grille should be coordinated to obtain the desired volume of outside air admitted.

NOTE

If an external CBR filter is connected to the air conditioner, the fresh air damper may be sealed in the closed position and/or the control knobs may be removed to prevent it from being opened.

(4) CBR Filtering Provision. A provision is made for connection of external CBR filtering equipment by removing a cover plate in the upper left hand corner of the back of the cabinet. The louvers in the

compressor motor circuit. The circuit breaker itself is located in the junction box inside the cab
but a remote reset knob connected through a flexible cable has been provided. The reset kno
located on the lower left side of the back of the cabinet. To reset, first pull out on the knob and t
push it fully in. When the circuit breaker is tripped, dc operating power to all control circuits is
interrupted and the air conditioner will not operate in any mode. The only item that will continu
operate is the compressor heating element. If the circuit breaker trips during operation, wait
minutes before attempting a restart. When a restart is made in the COOL mode, the evaporator
condenser fans will start immediately, but there will be a time delay of approximately 30 seco
before the compressor starts. If the circuit breaker immediately trips again, serious compres
problems are indicated: notify organizational maintenance and do not attempt another restart.

(2) High-Pressure Cutout Switch. The high-pressure cutout switch is mounted to the inside of the lo
left hand section of the lower back panel of the cabinet with its reset button protruding through
panel. The switch is connected through a capillary to the high pressure refrigerant line at the
charge side of the compressor. It is designed to trip at a pressure of approximately 460 psig
kg/cm^2). When the switch is tripped, the compressor and the condenser fan motor will not oper
but the evaporator fan motor and the heating elements will be unaffected. To reset, press in and t
release the reset button. If the switch trips during operation, wait two minutes before attemptir
restart. When a restart is made, the evaporator and condenser fans will start immediately, but th
will be a time delay of approximately 30 seconds before the compressor starts. If the switch t
again as soon as it is released, or shortly after the compressor starts, more serious problems are
dicated: notify organizational maintenance and do not attempt another restart.

(3) Low-Pressure Cutout Switch. The low-pressure cutout switch is mounted to the inside of the lo
back panel of the cabinet directly to the right of the high pressure cutout switch with its reset bu
also protruding through the panel. This switch is connected through a capillary to the low press
refrigerant line on the suction side of the compressor. This switch is designed to trip when the p
sure falls below approximately 7 psig (0.05 kg/cm^2). The functions and operation are the same
those described for the high pressure cutout switch in the preceding paragraph.

INDICATORS See figure 2-1.

refrigerant sight glass is the only visual indicator incorporated in the Model F36T4-2 air conditioner.
ted in the center left hand side of the back panel of the cabinet just to the left of the fresh air filter fra
ndicator is a small chamber with a glass window through which the refrigerant condition can be obser
stalled in the liquid refrigerant line between the liquid flow solenoid valve and the evaporator expan
Liquid refrigerant actually flows through the sight glass chamber only during cooling cycles when th
tioner is in operation in the COOL mode. (See paragraph 2-2.a.(1).(c). and figure 2-3 for a better un
ing.) Always make sight glass observations under these conditions.

olor coded information plate is attached to the back panel directly above the sight glass for compari
reen, chartreuse, and yellow bands on the information plate represent the approximate color of
ure sensitive indicator at varying degrees of moisture content. Dry refrigerant is indicated by gree
to chartreuse when the moisture content becomes undesirable, and to yellow when the level beco
ceptable. Excessive moisture in the refrigerant may damage or possibly destroy the compressor. If
refrigerant observed in the sight glass has an opaque, milky appearance, or frequent bubbles appear
e of refrigerant is low and the system should be charged. Either moisture or low charge indicat
d be reported to direct support maintenance for appropriate refrigeration system action.

yellow band or if numerous bubbles appear in the sight glass. COOL mode operation may be continued with the refrigerant color in the chartreuse band or with only an occasional bubble appearing in the window, but the sight glass should be rechecked after each four hours of operation to insure that the condition has not become worse.

Section II.

PREVENTIVE MAINTENANCE CHECKS AND SERVICES. (PMCS)

2-4. GENERAL

Preventive maintenance checks and services (PMCS) are essential to the efficient operation of the air co ner and to prevent possible damage that might occur through neglect or failure to observe warn mptoms in a timely manner. Checks and services performed by operators are limited to those functions w n be accomplished from the outside of the cabinet.

a. Before You Operate. Always keep in mind and observe the WARNINGS and CAUTIONS contained i technical manual and plates installed on the equipment that are associated with the functions yo about to perform. Perform your before (B) PMCS from Table 2-1.

b. While You Operate. Always keep in mind and observe the WARNINGS and CAUTIONS contained i technical manual and plates installed on the equipment that are associated with operating funct Perform your during (D) PMCS from Table 2-1.

c. After You Operate. Be sure to perform your after (A) PMCS from Table 2-1.

d. If Your Equipment Fails to Operate. Troubleshoot within your capabilities. Report any deficienci appropriate using the proper form as specified in TM 38-750.

NOTE

Within designated intervals, these checks are to be performed in the order listed. If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

B - Before
D - During
A - After
W - Weekly
M - Monthly

D-During

tem No.	Interval D	Item to be inspected	Procedures: Check for and have repaired or adjusted as ncessary	Equip Not Availa
1	●	Air conditioner	a. Check grilles are clear and free of obstructions and debris.	Grilles c be cleare obstruct debris.
			b. During startup and operation, check for unusual noises and excessive vibration. Check for improper heating or cooling and for proper operation of controls. If a defective part is suspected, notify organizational maintenance.	Output is low or it component is defect

. ASSEMBLY AND PREPARATION FOR USE

e Model F36T4-2 Air Conditioner is a completely assembled, self-contained unit as received. Unpackagin nstallation may involve some modification of the unit itself, modification of the room or enclosure in whic to be installed, and/or the fabrication and installation of ducting. Such requirements are beyond th bilities of operators. No specific operator preparation for use is required once the unit is in place.

. OPERATIONAL CHECKS

e air conditioner should be checked for operation in all modes after installation is completed and when be placed back in operation after an extended shut-down period.

CAUTION

Do not perform the operational check in COOL mode until input power has been supplied to the cabinet for at least four hours. Liquid refrigerant tends to migrate into the compressor cylinders during periods when the compressor heater is not operating. Under moderate climatic conditions, the compressor heater will normally "boil" all liquid refrigerant out of the cylinders within a four hour period. If the air conditioner has been exposed to below freezing temperatures without input power, an eight hour warm-up period is recommended.

Unsnap and roll up the fabric cover on the back of the cabinet. Secure it in the stowed position with th two straps and two turnbutton fasteners provided.

Individually adjust all louvers in both sections of the evaporator discharge grille in the fully ope (horizontal) position.

Using the operating levers, adjust the louvers in both sections of the evaporator intake grille in the ful open position.

Turn the fresh air damper control knob on the front to the fully closed (clockwise) position.

Turn the mode selector switch to VENTILATE. The evaporator fan should start immediately. Use a pap streamer or smoke to check the airflow into the evaporator intake grille and out of the evaporator di charge grille. To check maximum ventilation with fresh air, first turn the fresh air damper knob to ful open (counterclockwise) then adjust the louvers in both sections of the intake grille fully closed. Aga check the air flow out of the evaporator discharge grille; it should be approximately the same.

NOTE

For maximum ventilation with fresh air, it is necessary that room or enclosure air have a means of exit through an open door or window. If the room or enclosure is tightly closed, an overpressure will build up and decrease the volume of fresh air drawn in.

Fully open the louvers in the evaporator intake grille and fully close the fresh air damper.

Turn the temperature thermostat control knob to the fully INCREASE (clockwise) position and then tu the mode selector switch to LO HEAT. Place your hand in the airflow from the evaporator discharge gril

NOTE

The temperature thermostat control has an effective functional range between 40°F and 90°F (5°C and 32°C). In extreme conditions when ambient air temperature is below 40°F (5°C) or above 90°F (32°C), the operation in either LO HEAT or HI HEAT mode will vary from that described above.

CAUTION

f a knocking or pounding noise is heard when the compressor starts in the following check, im-mediately turn the mode selector out of the COOL position. Leave input power connected and wait at least two hours before attempting another start in cool mode.

rn the temperature thermostat control knob to the fully INCREASE (clockwise) position, then turn ode selector switch to COOL. Note that the evaporator and condenser fans start immediately and t e compressor starts approximately 30 seconds later. Hold your hand in the airflow from the evapora scharge grille; there should be no change in temperature. Now turn the temperature thermostat con ob to the fully DECREASE (counterclockwise) position and feel the discharge air temperature begi op almost immediately. Leave controls in the present position and perform the next check.

ter 15 minutes of operation check the sight glass and compare refrigerant condition with the co ded information plate provided. (See para. 2-3.)

rn the mode selector switch to OFF and observe that all air conditioner functions cease.

OPERATING PROCEDURES

eneral. The Model F36T4-2 air conditioner is designed for operation in a wide range of climatic cor ns either continuously or intermittently. The amount of operator attention required will vary depend specific local conditions for each installation. Under usual conditions, the air conditioner will be for the appropriate mode of operation at the beginning of a season and will only need starting a opping and minor adjustments for the rest of the season.

perational Mode Set-Up.

CAUTION

The fabric cover on the back of the cabinet must be rolled up and secured before the air condi-tioner is operated in COOL mode or in any mode when fresh air is to be admitted.

2-2 provides the recommended initial control settings to establish the desired mode of operation. Mi ents may be required to obtain the desired mixture of recirculated and fresh air and the air flow patte tioned air.

arting. Normally, the only operator action necessary to start the air conditioner in the mode for whic seasonally set up is to turn the mode selector switch to the appropriate position: VENTILATE, CO

Table 2-2
INITIAL OPERATOR CONTROL SETTINGS

ODE	MODE SELECTOR	THERMOSTAT	FRESH AIR DAMPER	EVAPORATOR INTAKE GRILLE	EVAPORATOR DISCHARGE GRILLE	FAE CO
ntilation h 100% circulated	VENTILATE	Inoperative	Fully Closed	Fully Open	Optional	Opt
ntilation h make-up sh air	VENTILATE	Inoperative	Partially Open	Partially Closed	Optional	Ope
ntilation h 100% esh Air	VENTILATE	Inoperative	Fully Open	Fully Closed	Optional	Ope
ating with 0% Recir-ated Air	LO HEAT or HI HEAT	Desired Temperature	Fully Closed	Fully Open	Slightly Downward	Opt
ating with ake-up esh Air	LO HEAT or HI HEAT	Desired Temperature	Partially Open	Partially Closed	Slightly Downward	Op
oling - with 0% Recircu-ed Air	COOL	Desired Temperature	Fully Closed	Fully Open	Slightly Upward	Op
oling with ake-up esh Air	COOL	Desired Temperature	Partially Open	Partially Closed	Slightly Upward	Op
Mode	Desired	Desired	Fully Closed	Partially Closed	Optional	Op

damper and/or roll down and snap in place the fabric cover during shut-down periods. If such practices are in effect, the operator must first unsnap, roll up and secure the fabric cover and appropriately adjust the fresh air damper before turning the mode selector switch to the desired operating mode.

) If the evaporator fan does not start immediately when the mode selector switch is turned to an operating mode, return the switch to OFF, reset the circuit breaker on the back of the cabinet an attempt a restart.

?) If the air conditioner still fails to start, check to insure that input power to the cabinet has not be disconnected.

CAUTION

If input power has been disconnected, do not start the air conditioner in COOL mode for a period of at least four hours after it has been reconnected.

3) If the air conditioner still fails to start with input power connected, report the problem to organiz tional maintenance.

4) When starting in COOL mode, if the evaporator fan starts, but the compressor fails to start appro imately 30 seconds later, turn the mode selector switch to OFF, press and release both the high a low-pressure cutout switch buttons on the back of the cabinet and attempt a restart. If the co pressor still fails to start after a 30 second delay, report the problem to organizational maintenan

5) If either the circuit breaker or the high or low-pressure cutout switch trips shortly after the co pressor starts in the COOL mode, reset the tripped switch and attempt one restart. If the same swit trips again, or if one of the other switches trip when a restart is made, do not attempt another rest and report the problem to organizational maintenance.

topping. Normally, the only operator action required to stop the air conditioner is to turn the mode sele or switch to OFF. Do not stop by using an input power disconnect.

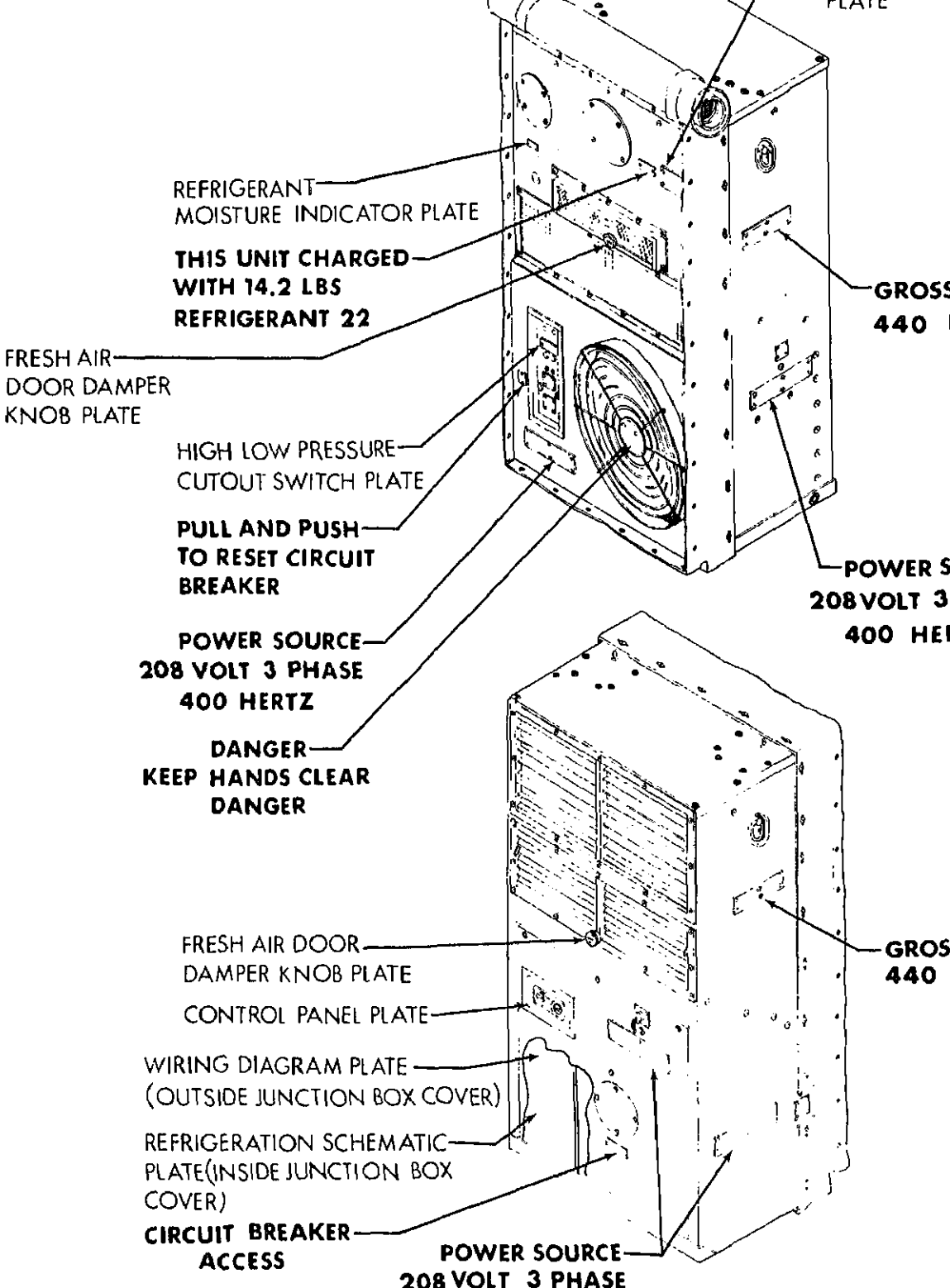
NOTE

If local practices have been established to further secure the air conditioner during shut-down periods, proceed in accordance with such practices.

INFORMATION PLATES See figure 2-4.

mber of information plates are provided on the exterior of the air conditioner cabinet. These plates a on, or adjacent to, the control or device to which they apply.

Control Panel Plate. This plate covers the face of the control panel. The information on the left hand si f the plate applies to the mode selector switch and reads from top to bottom HI HEAT, LO HEAT, OF ENTILATE and COOL. The information on the right hand side of the plate applies to the temperatu hermostat control and reads INCREASE with a clockwise arrow at the top, TEMP. in the center, a DECREASE with a counterclockwise arrow at the bottom.


REFRIGERANT MOISTURE INDICATOR PLATE
THIS UNIT CHARGED WITH 14.2 LBS REFRIGERANT 22
FRESH AIR DOOR DAMPER KNOB PLATE
HIGH LOW PRESSURE CUTOUT SWITCH PLATE
PULL AND PUSH TO RESET CIRCUIT BREAKER
POWER SOURCE 208 VOLT 3 PHASE 400 HERTZ
DANGER KEEP HANDS CLEAR DANGER
GROSS 440
POWER S 208 VOLT 3 400 HE
FRESH AIR DOOR DAMPER KNOB PLATE
CONTROL PANEL PLATE
WIRING DIAGRAM PLATE (OUTSIDE JUNCTION BOX COVER)
REFRIGERATION SCHEMATIC PLATE(INSIDE JUNCTION BOX COVER)
CIRCUIT BREAKER ACCESS
POWER SOURCE 208 VOLT 3 PHASE
GROS 440

me.

ront Fresh Air Damper Control Knob Plate. This plate is attached to the face of the front control kn
nd reads OPEN with a counterclockwise arrow at the top, FRESH AIR DOOR TURN in the center a
LOSE with a clockwise arrow at the bottom.

ccess Plate. This plate is located below the access cover in the center part of the lower front panel a
eads CIRCUIT BREAKER ACCESS. Access to the circuit breaker is for maintenance purposes; ope
rs will use the remote control reset knob on the lower left hand side of the lower back panel to reset
rcuit breaker.

eight Plates. There are two of these identical plates which read GROSS WEIGHT 440 POUNDS. C
ate is located on the center of the upper part of each side panel.

efrigerant Color Coded Plate. This plate is located on the upper back panel directly above the sig
lass. It is equally divided into three colored sections; green on the left, chartreuse in the center, a
ellow on the right. Across the top, it reads DRY (in the green section), CAUTION (in the chartreuse s
on), and WET (in the yellow section). Across the bottom it reads CHANGE DRIER.

ircuit Breaker Plate. This plate is located on the lower left hand side of the lower back panel directly
e left of the circuit breaker remote reset knob and reads PULL AND PUSH TO RESET CIRCU
REAKER.

ressure Cutout Switch Plate. This plate is located on the lower left hand side of the lower back pan
rectly above the pressure cutout switch reset buttons and reads HP CUTOUT PUSH TO RESET
UTOUT.

ack Fresh Air Damper Control Knob Plate. This plate is attached to the face of the back control kn
nd reads exactly the same as the front plate (para. 2-8.c.) except that the directional arrows a
versed; that is, clockwise to open, counterclockwise to close.

efrigerant Charge Plate. This plate is located on the upper right hand side of the upper back panel a
eads THIS UNIT CHARGED WITH 14.2 LBS REFRIGERANT 22.

ilitary Identification Plate. This plate is located on the upper right hand side of the upper back pan
nd contains the full nomenclature, model number, NSN, part number, manufacturer's name, contra
umber, date manufactured, serial number, and unit weight.

ondenser Fan Guard Plate. This plate is located in the center of the condenser fan guard and rea
ANGER KEEP HANDS CLEAR DANGER.

PREPARATION FOR MOVEMENT

pecial operator preparation is required when the air conditioner is to be moved to another locati
close the louvers in the evaporator intake and discharge grilles, close the fresh air damper, and r
nd snap in place the fabric cover on the back of the cabinet.

2-10. GENERAL

The Model F36T4-2 Air Conditioner is designed to operate normally within a wide range of climatic co
ns. However, some extreme conditions require special operating and servicing procedures to prevent un
ading and excessive wear on the equipment.

2-11. OPERATION IN EXTREME HEAT

The air conditioner is designed to operate in temperatures up to 120°F (49°C). Extra care should be take
nimize the cooling load when operating in extremely high temperatures. Some of the steps that may be t
e:

a. Check all openings in the enclosure, especially doors and windows, to be sure they are tightly clo
Limit in and out traffic, if possible.

b. Use shades or awnings to shut out direct rays of the sun.

c. Limit the use of electric lights and other heat producing equipment.

d. Limit the amount of hot, outside air introduced through the fresh air damper to that essential for ven
tion.

NOTE

Weatherstripping, the installation of storm doors and windows, if appropriate, and insulation of surfaces exposed to the outside is recommended when operating in extremely high temperatures for extended periods is anticipated.

2-12. OPERATION IN EXTREME COLD

CAUTION

Do not disturb electrical wiring that has been exposed to extremely low temperatures. Both the wire and insulation become brittle when cold and are easily broken.

The air conditioner is designed to operate in temperatures down to -50°F (-45°C). Extra care should be t
minimize the heating load when operating in extremely low temperatures. Some of the steps that ma
ken are:

a. Check all openings in the enclosure, especially doors and windows, to be sure they are tightly clo
Limit in and out traffic, if possible.

b. Open shades and awnings to permit entry of direct rays of the sun, if appropriate.

c. Limit the amount of cold, outside air introduced through the fresh air damper to that essential for ve
tion.

3. OPERATION IN DUSTY OR SANDY CONDITIONS

sty and sandy conditions can seriously reduce the efficiency of the air conditioner by clogging t and thereby causing a restriction on the volume of airflow. Accumulation of dust or sand in th r coil and/or in the compressor compartment may cause overheating of the refrigeration system. D may also clog the mist eliminator, condensate trap, and water drain lines. Some of the steps that m are:

Frequent cleaning of filters and all other areas of dust and sand accumulation. In extreme cond daily cleaning of filters may be necessary.

Limit the amount of dusty or sandy outside air introduced through the fresh air damper to that ess for ventilation.

Roll down and secure the fabric cover on the back of the cabinet during periods of shut-down.

4. OPERATION IN UNUSUALLY WET CONDITIONS

air conditioner is designed for normal exposure to the elements, so it is reasonably waterproof. So eps that should be taken in an extremely wet climate are:

More frequent inspection and cleaning of the mist eliminator, condensate trap, and drain lines to proper drainage and prevent accumulation of water inside the cabinet.

Roll down and secure the fabric cover on the back of the cabinet during periods of wet, windy w when the air conditioner is not in operation.

Roll up and secure the fabric cover during dry spells when the air conditioner is not in operation s the interior can dry out and condensation will not accumulate.

5. OPERATION IN SALT AIR OR SEA SPRAY

t air or sea spray may cause many of the same clogging problems as encountered when operatin or sandy environment. In addition, the nature of salt presents serious corrosion problems. Fre ing is necessary during which all exposed surfaces should be thoroughly spray rinsed or sponge water to remove salt encrustations. The fabric cover on the back of the cabinet should be rolled dow ed during all periods when the air conditioner is not in operation.

6. OPERATION UNDER EMERGENCY CONDITIONS

CBR Hazard. When operation is anticipated under potential chemical-biological-radiological (CBR ditions, a CBR filtering unit should be connected to the intake provided at the upper left hand cor the upper back panel of the air conditioner cabinet. The fresh air damper must remain fully closed operation under actual CBR conditions. Sealing the damper door in the closed position and remo the control knobs to prevent it from being opened is recommended. Adjust the evaporator intake louvers in conjunction with the CBR filter controls to provide a slightly higher overpressure with room or enclosure than in normal operation.

Power Conservation. During periods when full 208 volt, 3 phase power is in critically short supply air conditioner cannot be turned off completely, it should be operated in VENTILATE mode only.

take suitable precautions.

b. Take into account the effect of environmental conditions, such as extreme cold or heat, hig blowing snow, or any combination of factors, and take adequate precautions.

c. Establish a fire plan and provide for adequate precautions.

OPERATOR'S MAINTENANCE INSTRUCTIONS

Section/Paragraph

cation Instructions I
neral 3-1

Troubleshooting . . . . . .
Use of Troubleshooting Table . . . . . .

Section I

LUBRICATION INSTRUCTIONS

. GENERAL

e Model F36T4-2 Air Conditioner and its major components are designed so that very little lubrica ired during their serviceable lifetime. The refrigerant compressor and its drive motor are herm ed in a single container; sealed bearings are incorporated in the drive motor and the comp kcase contains a lifetime charge of oil. Sealed bearings are incorporated in the evaporator and con notors.

e only operator lubrication required is that necessary to relieve stiffness or binding of the louver bl vaporator intake and discharge grilles or the turn button fasteners associated with the fabric cover of the cabinet. Sparingly apply a light machine oil and work it into the joints or pivots involved. Blo ss oil with a cloth or paper towel. Report stiffness or binding of all other operational controls to org l maintenance for appropriate action.

Section II

TROUBLESHOOTING

. USE OF TROUBLESHOOTING TABLE

e 3-1 contains troubleshooting information useful to operators in diagnosing and correcting malfu satisfactory operation of the air conditioner.

The Troubleshooting Table lists the common malfunction symptoms operators are most likely counter during operation of the air conditioner; test and inspection steps to be followed to determ cause; and the corrective action that should be taken for each possible cause listed.

The operator should first find the malfunction symptom which most closely describes the imm situation, and then perform the test and inspection, and corrective action steps in the order in listed.

This manual cannot list all possible malfunction symptoms that may be encountered, nor can it possible test and inspection, and corrective action steps that may be taken. If a malfunction occ which no symptom is listed, or if the listed corrective actions do not resolve the trouble, supe

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. AIR CONDITIONER DOES NOT START IN ANY MODE.
   Step 1. Check to see if circuit breaker is tripped.
   Pull out, then push in circuit breaker remote reset knob.
   Step 2. Check to see if input power has been disconnected.
   Connect input power.

CAUTION

Do not start in COOL mode for four hours.

2. COMPRESSOR DOES NOT START IN COOL MODE.
   Step 1. Check to see if high or low pressure cutout switch is tripped.
   Press and release cutout switch reset buttons.
   Step 2. Check operation of mode selection switch.
   Turn switch to OFF, then reset to COOL.

NOTE

Allow 30 seconds time delay before compressor starts.

3. COMPRESSOR STARTS NORMALLY, BUT CIRCUIT BREAKER SOON TRIPS.
   Step 1. Check to be sure back fabric cover is rolled up.
   Roll up and secure fabric cover.
   Step 2. Check to be sure condenser fan intake screen and/or fan guard are not obst
   Remove obstruction.
   Step 3. Check to be sure of condenser fan operation.
   Reset circuit breaker and restart in COOL mode.

CAUTION

If condenser fan does not operate immediately, turn selector
OFF and contact organizational maintenance.

4. COMPRESSOR STARTS NORMALLY, BUT HIGH OR LOW PRESSURE CUTOUT SWITCH
   Step 1. Check to be sure fabric cover is rolled up.
   Roll up and secure fabric cover.
   Step 2. Check to be sure condenser fan intake screen and/or fan guard are not obst
   Remove obstruction.
   Step 3. Check to be sure of condenser fan operation.
   Reset circuit breaker and restart in COOL mode.

CAUTION

CORRECTIVE ACTION

Step 4. Check condition of refrigerant in sight glass.
If refrigerant color is in the yellow zone or numerous bubbles appear in the windo
selector switch to OFF and contact direct support maintenance.

EDUCED COOLING CAPACITY.

Step 1. Check that the louvers in the evaporator intake and discharge grilles are properly adjus
Adjust louvers properly.

Step 2. Check to be sure that excessive hot, outside air is not being introduced through the fr
damper.
Fully close damper, then, if condition improves, adjust properly.

Step 3. Check that all doors, windows, and other openings in the room or enclosure are tightly
Tightly close all openings.

Step 4. Check operation of temperature thermostat control.
Set control at maximum DECREASE, then, if condition improves, adjust properly.

Step 5. Check to be sure condenser fan intake screen and/or fan guard are not obstructed.
Remove obstruction.

Step 6. Check condition of refrigerant in sight glass.
If refrigerant color is in the yellow zone or numerous bubbles appear in window, turn s
to OFF and contact direct support maintenance.

EDUCED HEATING CAPACITY.

Step 1. Check that the louvers in the evaporator intake and discharge grilles are properly adjus
Adjust louvers properly.

Step 2. Check to be sure that excessive cold, outside air is not being introduced through the fr
damper.
Fully close damper, then, if condition improves, adjust properly.

Step 3. Check that all doors, windows, and other openings in the room or enclosure are tightly
Tightly close all openings.

Step 4. Check operation of temperature thermostat control.
Set control to fully INCREASE, then, if condition improves, adjust properly.

Step 5. If control panel is remotely located, check to be sure that the sensing bulb is not near a lig
or some type of heat producing equipment.
Turn off or move heat source, or move the remote control panel.

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Condenser Fan .....
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Evaporator Coil .....
Condenser Coil .....

Section I

REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

. GENERAL

pair parts are listed and illustrated in TM5-4120-363-24P. No special tools are required for maintena quipment. Test, maintenance and diagnostic equipment (TMDE), and support equipment include sta rical test equipment found in any organizational maintenance electric shop.

Section II

SERVICE UPON RECEIPT OF EQUIPMENT

. UNLOADING

e Model F36T4-2 Air Conditioner is packaged in a wooden container designed for shipment and ha the cabinet in an upright position. The base of the container is constructed as a shipping pallet with for the insertion of the tongs of a fork on materials handling equipment.

Remove all blocking and tiedowns that may have been used to secure the container to the carri

be used, use an appropriate sling so that the weight of the unit is borne by the base of the shipping container.

4-3. UNPACKING (See fig. 4-1.)

a. General. Normally, the packaged air conditioner should be moved into the immediate area in which to be installed before it is unpacked.

NOTE

The shipping container is of such a design that it may be retained for reuse for mobility purposes if frequent relocation of the air conditioner is anticipated.

b. Remove Shipping Container. Cut the metal bands that hold the top and sides of the container to the b Lift the container vertically and remove it from the base and cabinet.

c. Remove Packaging. Remove the cushioning around the top of the cabinet and retain, if reuse is an pated. Remove the preservation barrier by tearing around the bottom of the cabinet. Remove the tec cal publications envelope and accessory sack that are taped to the cabinet and put them in a safe pl

NOTE

It is recommended that the cabinet be left bolted to the shipping pallet until time to place it in the installation position. All receiving inspection actions can be conducted without removal from the pallet.

d. Remove Pallet. Attach an overhead hoist with an appropriate sling and spreader bar to the lifting fitt provided at each side of the cabinet. Raise the cabinet and remove the four carriage bolt assemblies hold the tiedown bars to the pallet from the underside of the pallet. Remove the four bolts that hold two tiedown bars to the unit base. Remove and retain the pallet and carriage bolt assemblies and tiedown bars and bolts, if reuse is anticipated. Be sure to remove all remaining barrier material from underside of the cabinet base. Lower the cabinet to the floor in the desired position and remove the s and hoist.

NOTE

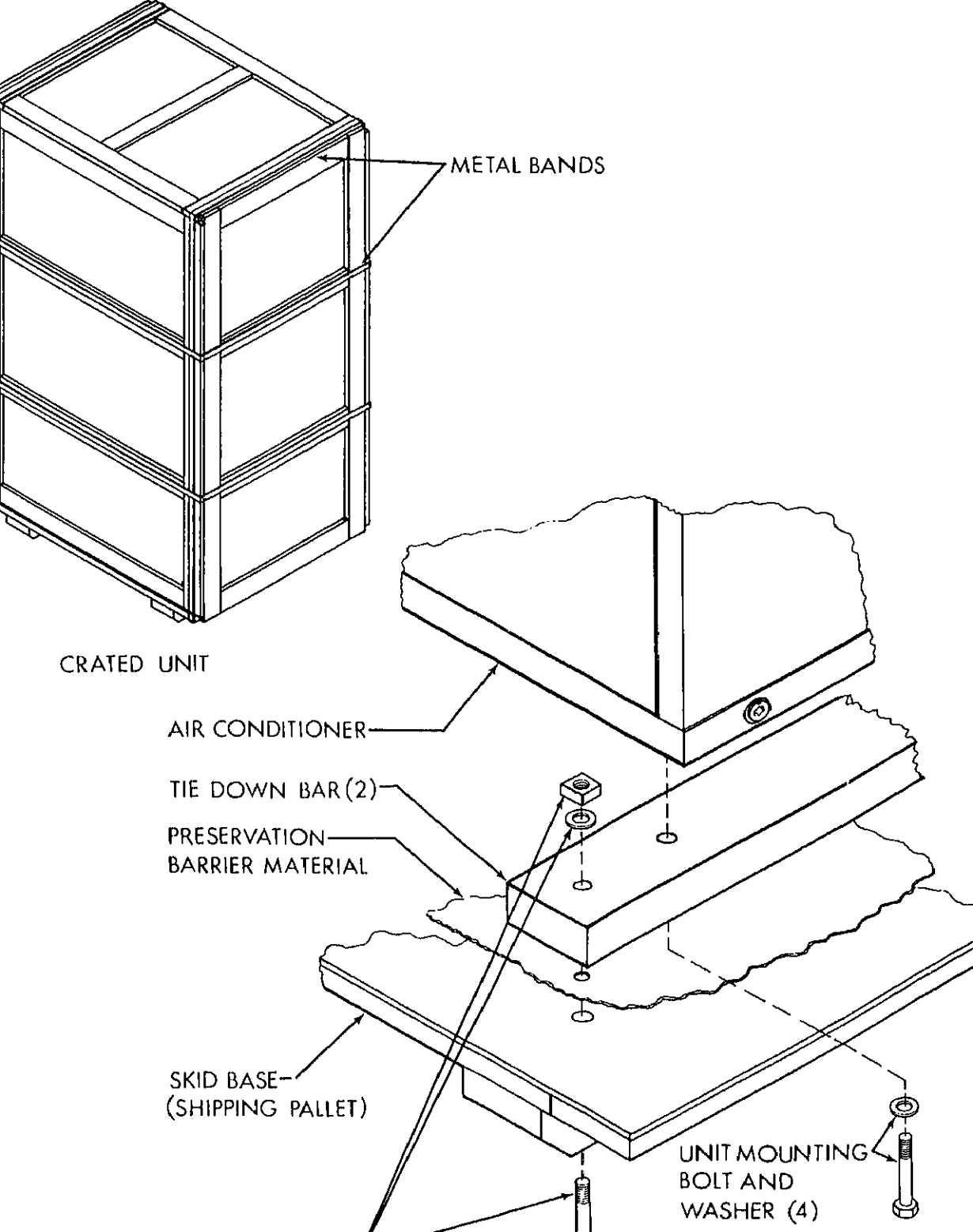
The bolts used to anchor the cabinet base to the tiedown bars may be used to anchor it in place in the installed location if the installation method allows for anchoring from beneath.

4-4. RECEIVING INSPECTION

Perform receiving inspection of the air conditioner in the following manner:

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, re damage on DD Form 6, Packaging Improvement Report.

b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepan in accordance with the instructions of TM 38-750.


METAL BANDS
CRATED UNIT
AIR CONDITIONER
TIE DOWN BAR (2)
PRESERVATION
BARRIER MATERIAL
SKID BASE
(SHIPPING PALLET)
UNIT MOUNTING
BOLT AND
WASHER (4)

enclosure and the back outside. Alternate installations may be made with the entire cabinet either inside or outside the conditioned area. The following are minimum requirements for all installations:

(1) A relatively level surface capable of bearing the weight of the air conditioner on which to set the base. To insure proper condensate drainage, the surface should be level within 5° from front to back and side to side. Base dimension requirements are 30-1/2 ± 1/2 inches (77.5 ± 1 cm) by 18-1/2 ± 1/2 inches (47 ± 1 cm).

(2) An unobstructed flow of air from outside the conditioned area to the intake and discharge of the condenser fan.

(3) An unobstructed flow of air from inside the conditioned area to the intake and discharge of the evaporator fan.

(4) An unobstructed flow of air from outside the conditioned area to the fresh air damper intake and/or CBR filter intake, if installed.

(5) Access to the front and back of the cabinet for routine operation and servicing and for necessary maintenance actions.

(6) Access to the top of the cabinet for removal of the top panel and sufficient headrocm to allow maintenance actions and internal component removal and installation through the top panel opening.

(7) A source of 208 volt, 3 phase, 400 Hertz input power rated at 48 amps. The power source outlet should be located as near as possible to the installed location of the air conditioner. The power source wiring must include a disconnect switch. However, provisions should be made to insure that power is not disconnected during normal operation and that the disconnect is not used to turn off the air conditioner for normal shut-down.

(8) An earth ground capable of handling 48 amps.

Typical Installation. Prepare an opening in an exterior wall 32 ± 1/2 inches (82.5 ± 1 cm) wide by 59 ± 1/2 inches (151 ± 1 cm) high.

Inside Installation. Manufacture an arrangement of ducts for the condenser intake and discharge air, and the fresh air damper intake and/or CBR filter intake, if installed. Ducts may be compatible for attachment to the air conditioner cabinet using the mounting holes for the condenser fan intake screen and condenser fan guard, and the fresh air filter frame and/or the air intake on the CBR filter or some other arrangement may be made. Prepare appropriate openings in an exterior wall for the ducts. Ducts may be compatible for installation of the condenser fan intake screen and condenser fan guard and the fresh air filter and frame on the outside ends or adequate replacements or some other arrangement of these items may be provided.

Outside Installation. Manufacture an arrangement of ducts for the evaporator intake and discharge air. Ducts may be compatible for attachment to the air conditioner cabinet using the mounting holes for the evaporator intake and discharge grilles or some other arrangement may be made. Ducts may also be compatible for installation of the evaporator intake and discharge grilles on the inside ends or replacements for these items may be used. Prepare appropriate openings in the appropriate wall for the ducts

WARNING

Be sure input power is disconnected before doing any work inside the air conditioner cabinet. Voltages used can be lethal.

1) Loosen the setscrew and remove the front fresh air damper control knob. Remove the 12 screws flat washers that mount the evaporator intake grille to the front of the cabinet and remove the in grille. Be careful to not damage the sealing strips glued to the back of the grille.

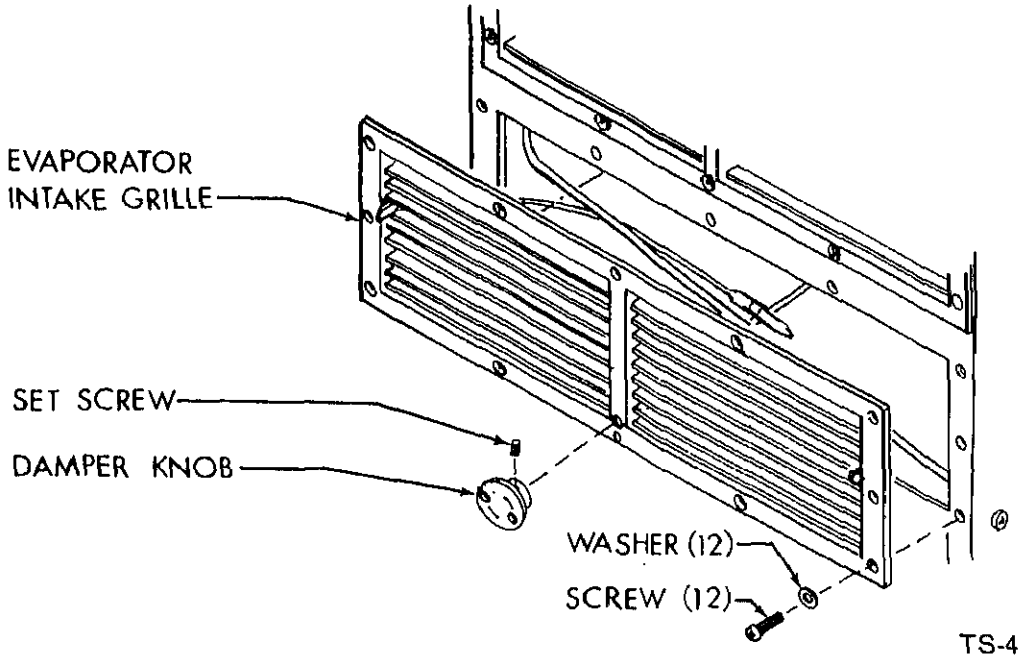


Figure 4-2. Evaporator Intake Grille Removal

2) Loosen the five captive panel fastener screws and remove the lower front panel from the cabine the top of the panel forward and then lift straight up to clear the flange on the bottom of the p

3) Disconnect wiring harness connector P8 from connector J8 on the control panel assembly. Rer the four bolts that mount the control panel assembly to the top of the junction box.

4) Loosen the nut and screw in the two loop clamps that hold the temperature thermostat control s ing bulb to the condensate drain tube in the center of the evaporator intake air section and slid bulb out of the loop clamp.

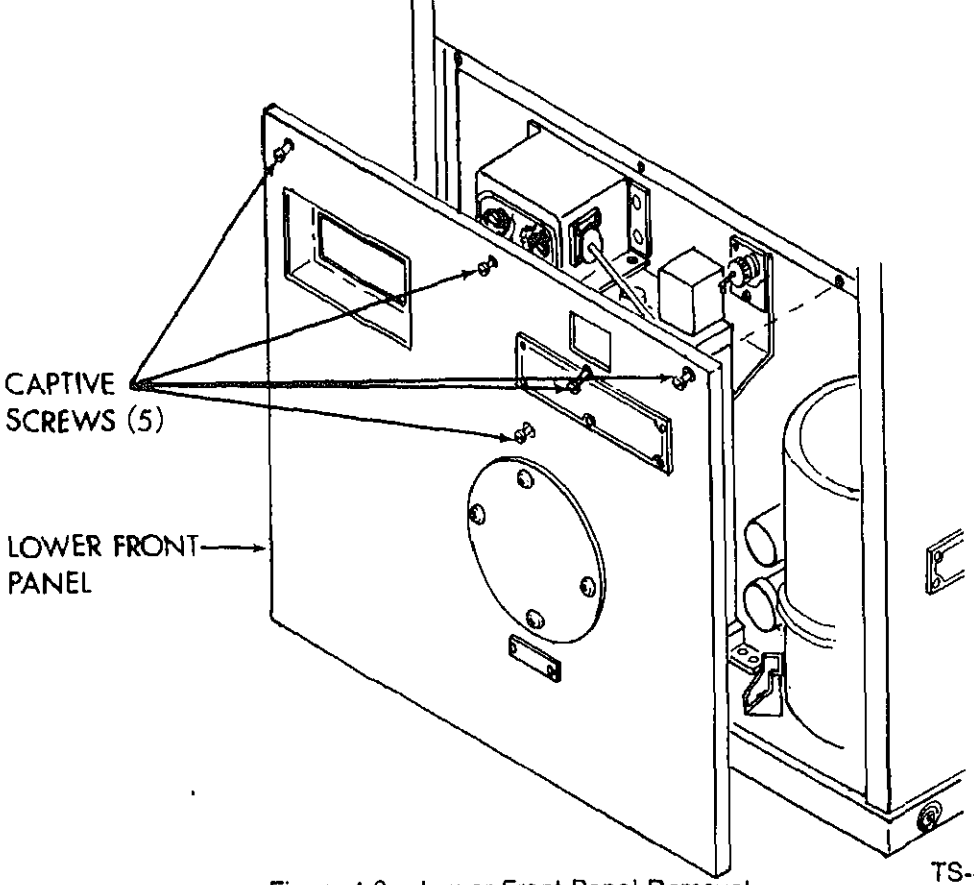
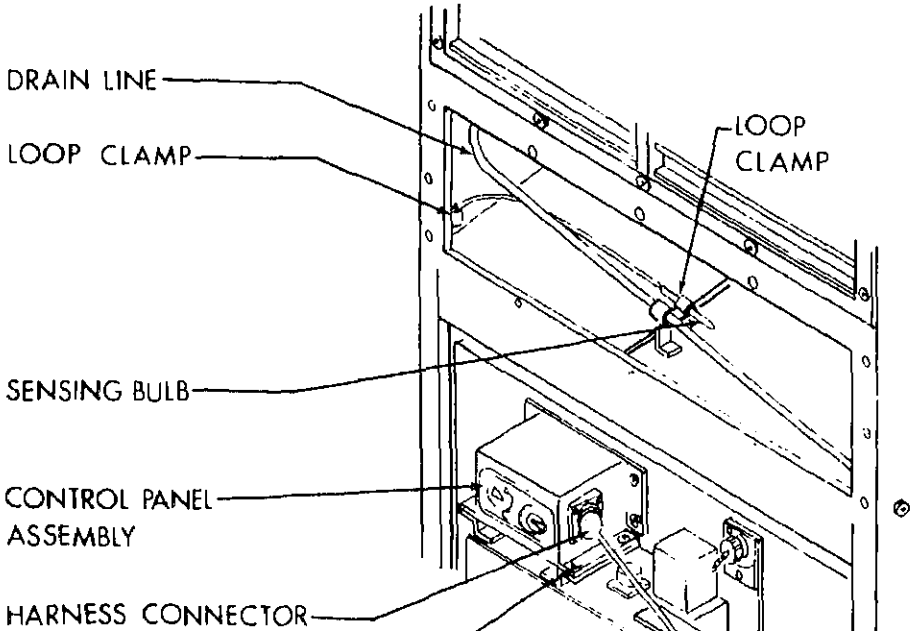


Figure 4-3. Lower Front Panel Removal



(6) Remove the control panel assembly while carefully feeding the capillary and sensing bu
the left side panel and the cabinet partition. Be extremely careful to not damage or kink th

(7) Very carefully coil the capillary and mount the sensing bulb to the back of the control pan
using the loop clamp provided for that purpose.

(8) Mount the block-off assembly on the top of the junction box using the four bolts rem
above.

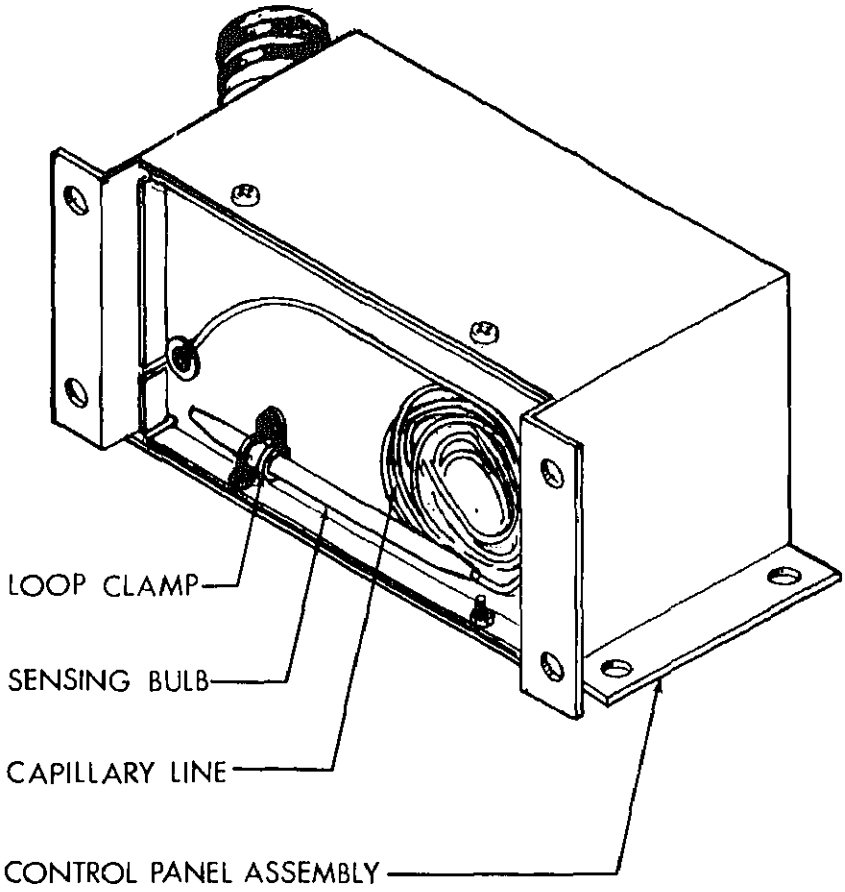


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Figure 4-5. Control Panel with Sensing Bulb for Remote Mounting

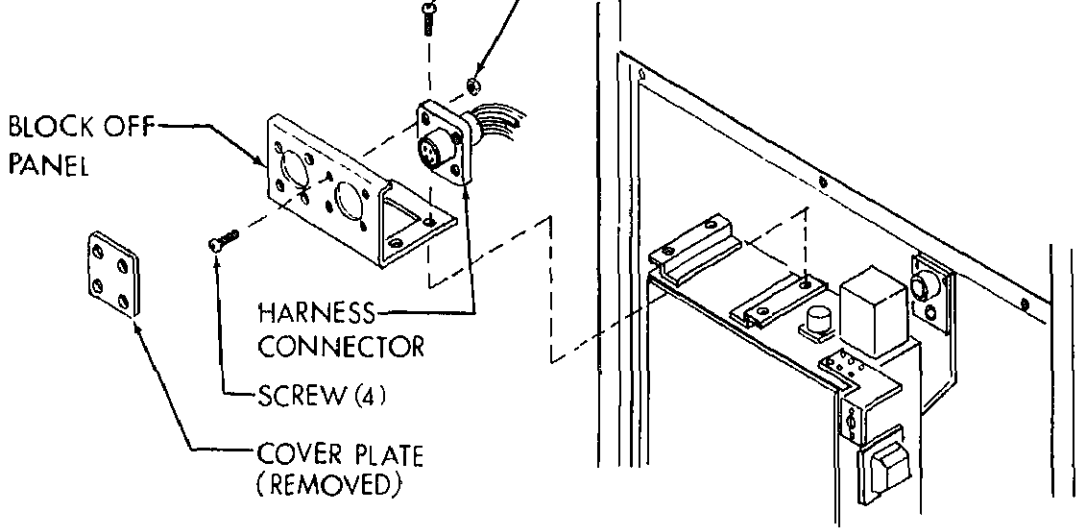


Figure 4-6. Block-off Panel Installation

NOTE

The wiring harness that connects the control panel assembly to the junction box is designed that, when the control panel is remotely located, connector P8 may be mounted in either ope ing in the block-off plate, or in an opening in the lower left hand corner of the lower back pan

(9) Remove the four screws, nuts and the blank cover plate at the desired location for the remo connector and mount connector P8 in the opening using the same four screws and nuts. cover plate for possible future use.

(10) Install the evaporator intake grille, the front fresh air damper control knob, and the lower f

(11) Mount the control panel in the desired remote location.

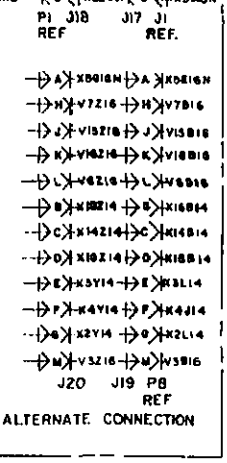
(12) Construct an interconnecting cable harness of the required length using the materials "Alternate Connection" in the lower left hand corner of the wiring diagram provided in

NOTE

The wiring diagram is also provided on an information plate attached to the outside front co of the junction box.

(13) After the air conditioner is installed in its operating location, connect the constructed wiri between connector P8 on the cabinet and connector J8 on the control panel assembly.

Inside Installation. Preparation of the air conditioner for inside installation will vary with the du

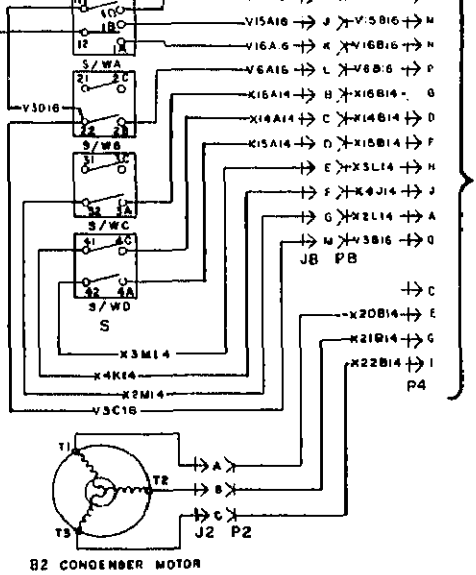


POWER SUPPLY
208 VOLT
3 PHASE
400 HERTZ

LINE A
LINE B
LINE C
GND

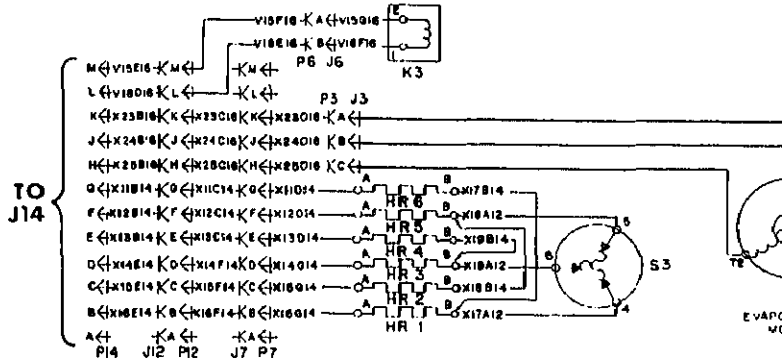
TO J13

P1 J1 P13



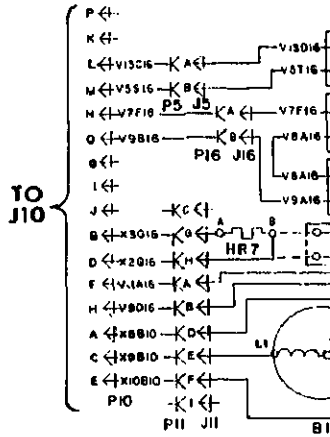
B2 CONDENSER MOTOR

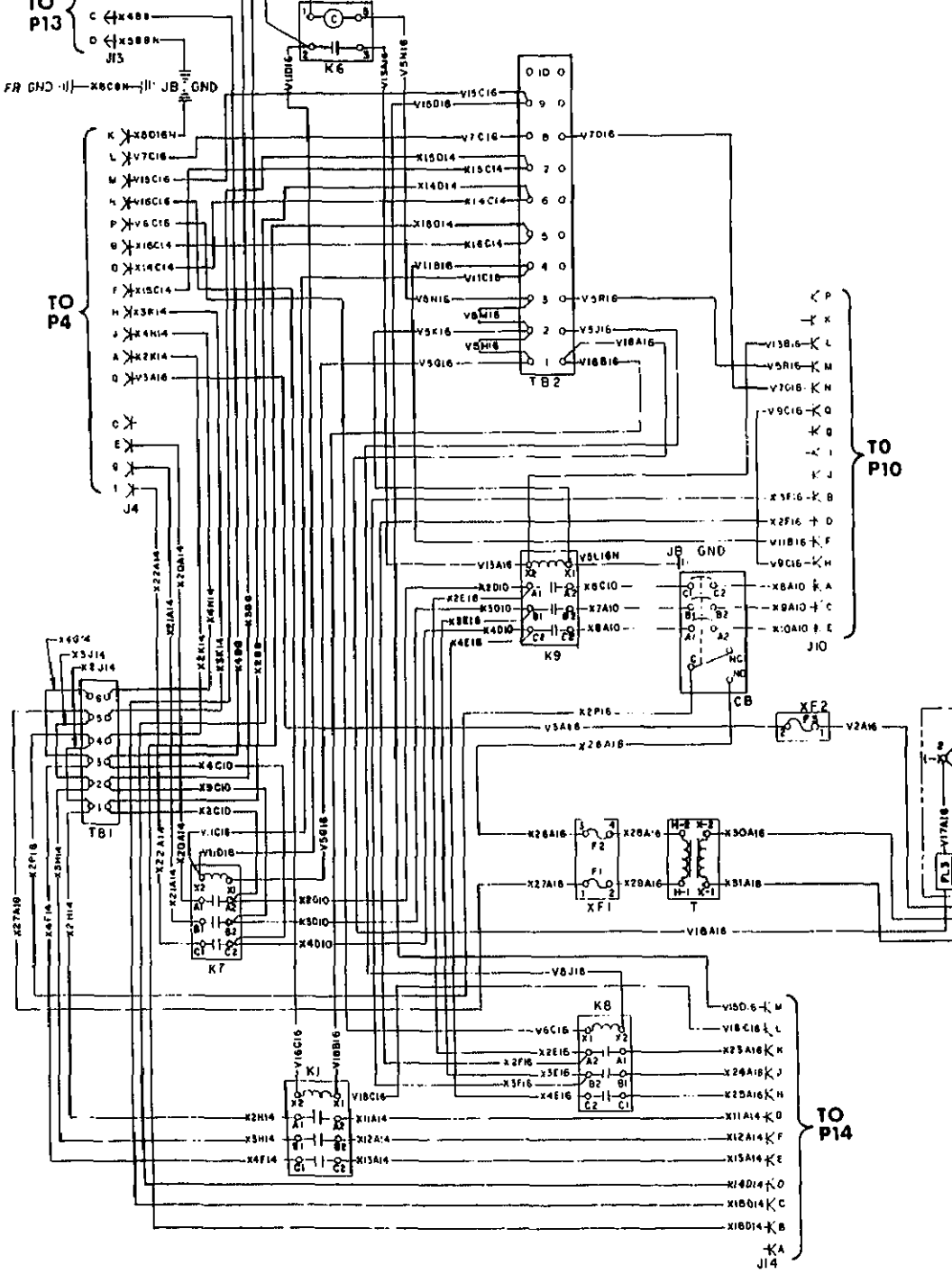
		SWITCH POSITION				
	CONTACT NO	1 HI HEAT	2 LO HEAT	3 OFF	4 VENT	5 COOL
	1 2 AND 1A	CLOSED	CLOSED	OPEN	OPEN	OPEN
WA	1 2 AND 1B	OPEN	OPEN	OPEN	OPEN	CLOSED
	11 AND 1D	OPEN	OPEN	OPEN	OPEN	CLOSED
WB	22 AND 2B	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
WC	32 AND 3A	CLOSED	CLOSED	OPEN	OPEN	OPEN
	42 AND 4A	CLOSED	OPEN	OPEN	OPEN	OPEN
WD	41 AND 4C	CLOSED	OPEN	OPEN	OPEN	OPEN



LEGEND		
SYMBOL	PART NO	DESCRIPTION
	013216E4511	FILTER ASSEMBLY
	013217E6796-2	COMPRESSOR
	D13214E3977-4	CONDENSER MOTOR
	013214E3976-4	EVAPORATOR MOTOR
	013216E8205-6	CIRCUIT BREAKER
F	MIL-F-18180	FUSE (TYPE FD9B250V16/10A)
	81321IE3788	FUSE
H	013214E8981	HEATING ELEMENT
H	WITH COMPRESSOR	HEATING ELEMENT
	MS3100R-24-22P	CONNECTOR, RECEPTACLE
	MS3102R-16-10P	CONNECTOR, RECEPTACLE
	MS3102R-14S-7P	CONNECTOR, RECEPTACLE
	MS3102R-36-14S	CONNECTOR, RECEPTACLE
	MS3102R-12S-3P	CONNECTOR, RECEPTACLE
	MS3102R-12S-3P	CONNECTOR, RECEPTACLE
	MS3100R-28-98X	CONNECTOR, RECEPTACLE
	C13211E8399C28-8P	CONNECTOR, RECEPTACLE
	MS3102R-36-14SX	CONNECTOR, RECEPTACLE
	MS3102R-24-11P	CONNECTOR, RECEPTACLE
	MS3100R-28-9S2	CONNECTOR, RECEPTACLE
	MS3102R-24-22PX	CONNECTOR, RECEPTACLE
	MS3102R-28-9SW	CONNECTOR, RECEPTACLE
	MS3102R-12S-3PY	CONNECTOR, RECEPTACLE
	M8624192-01	RELAY HEATER
	C1314E5971	VALVE, SOLENOID
	C13216E8182-1	RELAY, TIME DELAY
	MS 24192-01	RELAY, CONDENSER
	MS 24192-01	RELAY, EVAPORATOR
	MS 24193-01	RELAY, COMPRESSOR

LEGEND		
SYMBOL	PART NO	DESCRIPTION
P1	MS 3106R-24-22S	CONNECTOR, PLUG
P2	MS 3106R-16-10S	CONNECTOR, PLUG
P3	MS 3106R-14S-7S	CONNECTOR, PLUG
P4	MS 3106R-36-14P	CONNECTOR, PLUG
P5	MS 3106R-12S-3S	CONNECTOR, PLUG
P6	MS 3106R-12S-3S	CONNECTOR, PLUG
P7	MS 3106R-28-9PX	CONNECTOR, PLUG
P8	MS 3100R-28-9S	CONNECTOR, RECEPTACLE
P10	MS 3106R-36-14PX	CONNECTOR, PLUG
P11	MS 3106R-24-11S	CONNECTOR, PLUG
P12	MS 3106-28-9PZ	CONNECTOR, PLUG
P13	MS 3106R-24-22SX	CONNECTOR, PLUG
P14	MS 3106R-28-9PW	CONNECTOR, PLUG
P16	MS 3106R-12S-3SY	CONNECTOR, PLUG
S	C13211E9295	SWITCH, ROTARY
S1	C13211E8301-1	THERMOSTAT
S3	C13211E4036	THERMOSTAT, HEATER
S4	WITH COMPRESSOR	THERMOSTAT, COMPRESSOR MOTOR
S5	C13211E8404	SWITCH, HIGH PRESSURE CUTOUT
S6	C13214E4309	SWITCH, LOW PRESSURE CUTOUT
T	D13214E3818-6	TRANSFORMER
TB1	C13214E4015	TERMINAL BLOCK
TB2	MIL-T-55164/3	TERMINAL BLOCK (TYPE 55TB10
XF1	B13211E3784	FUSE HOLDER
XF2	B13214E3811	FUSE HOLDER
S8	WITH COMPRESSOR	THERMOSTAT (WHEN REQD)
J17	C13211E8399C24-22S	CONNECTOR, RECEPTACLE
J18	MS 3100R-24-22P	CONNECTOR, RECEPTACLE
J19	C13211E8399C28-8P	CONNECTOR, RECEPTACLE
J20	MS 3100R-28-9S	CONNECTOR, RECEPTACLE




TO P13
J13
FR GND
JB GND
K6
TB2
TO P4
J4
TO P10
J10
K9
CB
XF2
TB1
K7
XF1
T
K8
K1
TO P14
J14

attach the base to the tiedown bars in the shipping container. There are 7/16"-14 UNC clinch nuts alled on the top of the base at these four locations. If the installation method allows for anchoring fr eneath the floor, the bolts from the tiedown bars in the shipping container, or similar bolts of an opriate length, can be inserted through the floor and threaded into the clinch nuts. If the base must nchored from the top, prepare the air conditioner as follows:

NOTE

It is recommended that the following preparation be performed as the last step before placing the cabinet in its installation location.

1) Loosen the five captive panel fastener screws and remove the lower front panel from the cabinet. the top of the panel forward and lift straight up to clear the flange at the bottom.

2) Attach an overhead hoist through a sling and spreader bar, to the lifting fitting on each side of cabinet and raise the cabinet several feet off the floor.

3) Insert the shipping bolts into the holes in the base and thread them into the clinch nuts.

4) Tap the heads of the bolts with a hammer until the clinch nuts are driven out of the top side of base.

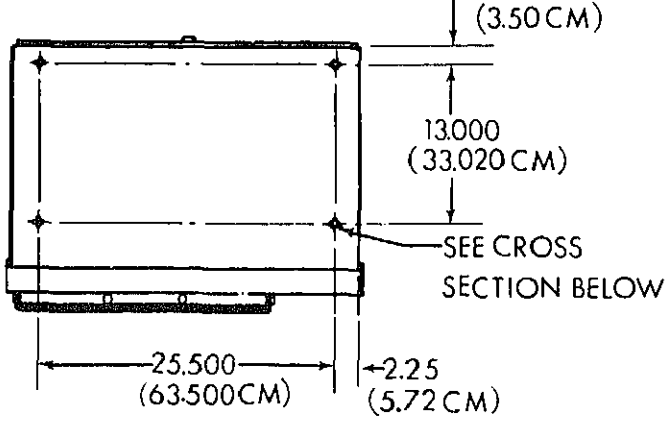
5) Remove the clinch nuts from the bolts from inside the cabinet, then remove the bolts. Retain clinch nuts and bolts for possible future use.

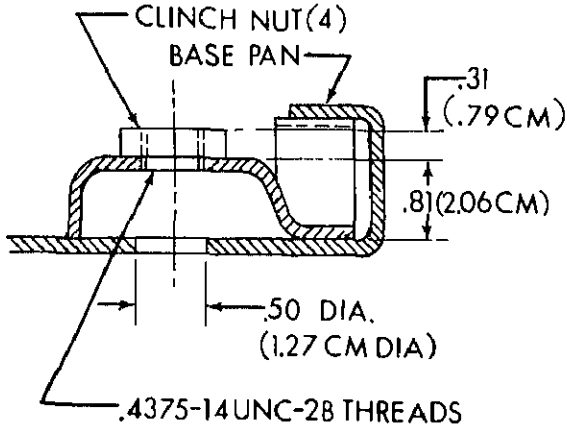
NOTE

If proceeding directly with installation, move the air conditioner into its operating location before lowering it to the floor. If there is to be a delay prior to installation, lower to the floor for the duration of the delay.

op Support. See figure 4-9. Some installations (particularly in the wall of a van) require that a top s ort attached to the back of the cabinet be provided. There are 11 threaded holes provided in the bac e cabinet for attachment of a top support, when required. In order to attach such a support, i ecessary to completely remove the fabric cover. Remove the 29 screws and washers that attach abric cover to the top, sides and bottom of the cabinet, then remove the cover and barrier material str eplace all 29 screws and washers. This will protect the threads in the rivnut and prevent air leaks. In tion, the six screws in the bottom also attach the lower back panel to the base. Retain the cover ossible future use.

nput Power Cable. Construct an input power cable of the required length using the cable connec upplied in the accessory bag for the air conditioner end. Four size 8 conductors rated for 600 volt ser re required.

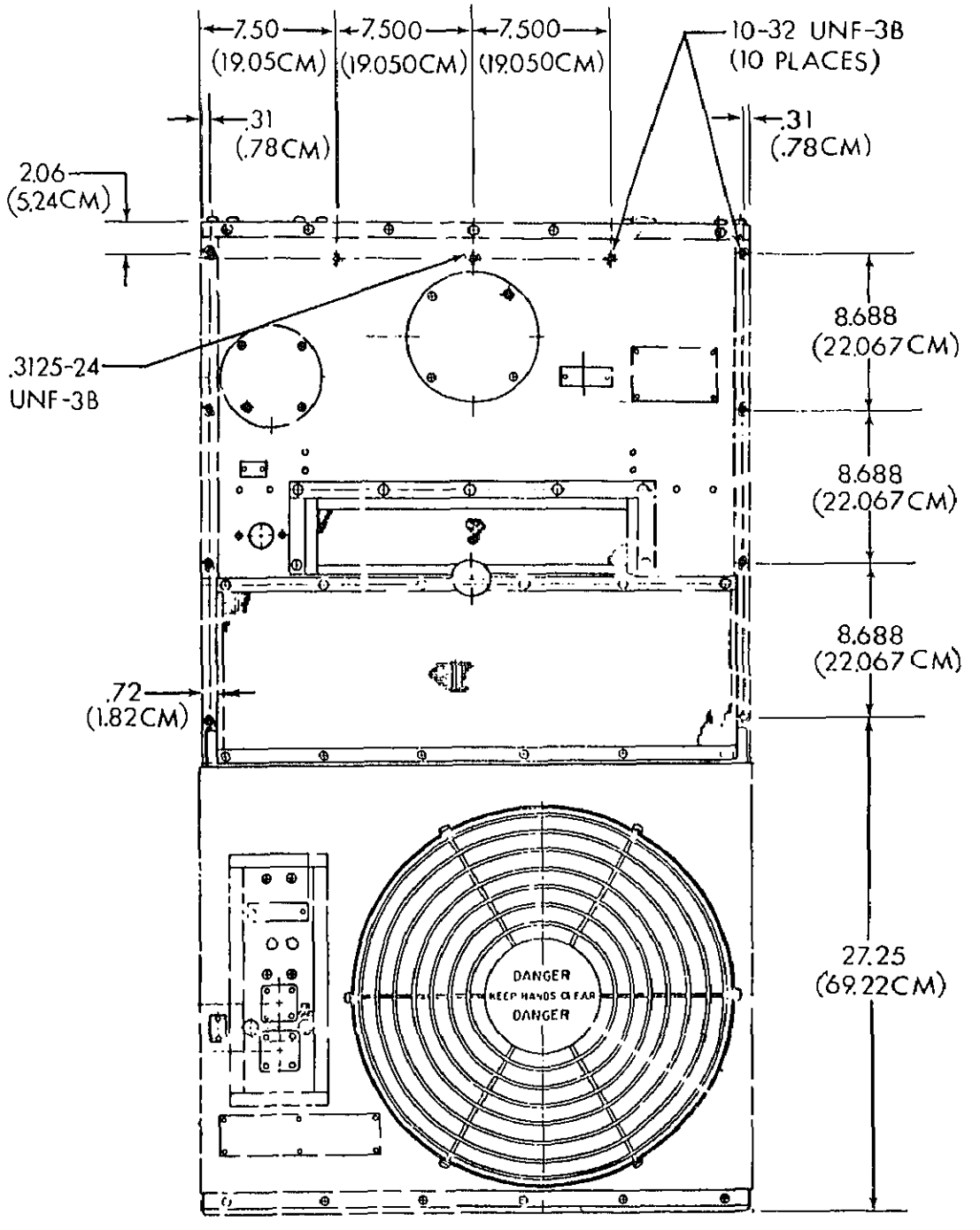




TYPICAL CROSS SECTION OF BASE MOUNTING HOLES

TS-4120-363-14/4-8

Figure 4-8. Base Mounting



TS-4120-363-14/4-9

e air conditioner as follows:

NOTE

The following instructions apply specifically to a typical installation with the back of the air conditioner protruding through an opening in an exterior wall. For other optional installation methods, the instructions must be modified as necessary to meet the requirements of the option chosen.

a. Attach an overhead hoist through a sling and spreader bar to the lifting fittings on each side cabinet and raise the air conditioner.

b. Move the cabinet into its operating location and lower it so that the base is resting on the flat s prepared for it. Aline as necessary for the method of anchoring to be used.

c. Using the appropriate hardware, anchor the base to the floor.

d. If shims were used to obtain a level surface for the base in a typical installation, fill all cracks betwe base and the floor from the outside to seal out the elements.

e. Install the top support to the back of the cabinet and secure it to the wall, if required.

f. Install the removable filler plate above the top of the cabinet.

g. Fill in the spaces between the sides of the cabinet and the wall opening with flexible plastic fo some other suitable insulation material, and seal with pressure sensitive tape.

h. Remove one of the four drain plugs from the base assembly, install an appropriate fitting, and i condensate drain line.

NOTE

The drain holes are threaded for Standard 1/2" -14 NPT fittings. If the base is less than level, the drain hole in the lowest corner should be used to ensure most drainage. Any type of hose or tubing may be used as a drain line. The drain line should lead to an appropriate drain, storm sewer, dry sump or an acceptable outside area. Be sure the entire length of the drain line is at the same height, or lower, than the base to ensure gravity drainage.

i. Install a bare No. 10 AWG ground wire between the grounding stud in the lower left hand corne lower back panel of the air conditioner and an adequate earth ground.

j. Install the constructed power cable between the input power receptacle and the 208 volt, 3 pha Hertz power source outlet.

refrigerant compressor and its drive motor are hermetically sealed in a canister. The comp
kcase has a lifetime supply of oil and the drive motor has permanently lubricated, sealed bearing
orator and condenser fan motors also have permanently lubricated, sealed bearings. The evaporat
enser fan motors also have permanently lubricated, sealed bearings. No lubrication of these items
ed.

9. MECHANICAL LUBRICATION

only mechanical items which may require lubrication are the louvers in the evaporator intake ar
ge grilles and the devices which operate the fresh air damper door. These points should be checke
cated, as necessary, during preventive maintenance service. A few drops of light oil should be app
points, bearing surfaces, and linkages to prevent or eliminate stiffness or binding. Be sure to wipe
ss oil with a cloth or paper towel. These items are in an area of high volume airflow and excess oil w
tract and accumulate dust particles from the passing air. Graphite may be used as an alternate lub
ng extreme cold weather operation.

Section IV

PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

10. GENERAL

ematic, periodic, preventive maintenance checks and services (PMCS) are essential to ensure that
litioner is ready for operation in any mode at all times. The purpose of a preventive maintenance pr
discover and correct defects and deficiencies before they can cause serious damage or complete
e equipment. Any effective preventive maintenance program must begin with the training of opera
rt all unusual conditions noted during daily checks or actual operation to organizational maintenar
cts and deficiencies discovered during maintenance inspections must be recorded, together with c
action taken, on DA Form 2404 (Equipment Inspection and Maintenance Worksheet).

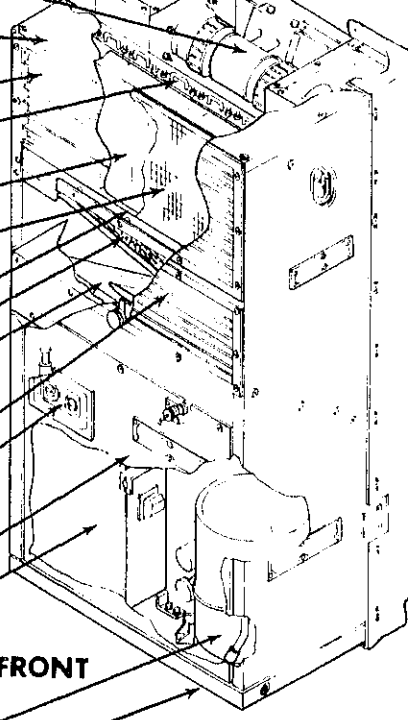
11. INSPECTION AND SERVICE

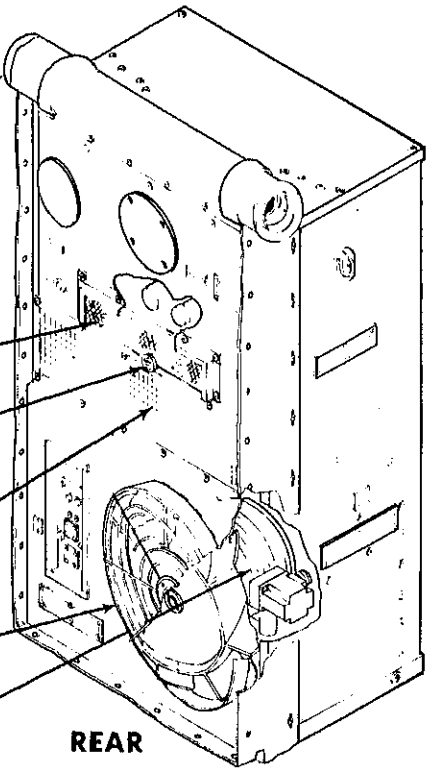
A schedule for organizational preventive maintenance inspection and service should be establish
mediately after installation of the air conditioner. A quarterly interval, equal to three calendar mo
250 hours of operation, whichever occurs first, is recommended for usual operating conditions.
operating under unusual conditions, such as a very dusty or sandy environment, it may be neces
reduce the interval to monthly or even less if conditions are extreme.

Table 4-1 lists the organizational preventive maintenance checks and services that should be per
at quarterly (or otherwise established) intervals. Figure 4-10 shows the location of PMCS item
PMCS items in the table have been arranged and numbered in a logical sequence to provide for
personnel efficiency and least amount of required maintenance downtime. The "Para Ref" column
right side of the table provides the paragraph number where detailed, step-by-step disasse
reassembly maintenance procedures may be found.

WARNING

Disconnect input power before disassembly of the air conditioner for PMCS to prevent danger-





(21) TOP AND UPPER FRONT OF CABINET

(4) EVAPORATOR DISCHARGE GRILLE

(10) HEATING ELEMENTS

(9) EVAPORATOR COIL

(8) MIST ELIMINATOR

(12) CONDENSATE TRAP AND DRAIN

(6) CONDITIONED AIR FILTER

(14) CONDENSER COIL

(5) EVAPORATOR INTAKE GRILLE

(17) CONTROL PANEL

(7) (20) LOWER FRONT PANEL

(18) JUNCTION BOX

(16) COMPRESSOR

(19) CABINET BASE

(23) FABRIC COVER

(1) (22) FRESH AIR FILTER

(13) FRESH AIR DAMPER

(2) (22) CONDENSER INTAKE SCREEN

(3) (22) CONDENSER FAN GUARD

teu.

Q-Quarterly S-Semiannually

m .	Interval Q	Interval S	Item to be inspected	Procedure: Check for and have repaired, replaced, cleaned, or adjuste as necessary Perfomm all operator PMCS first
				WARNING Disconnect air conditioner power cable before removing covers or guards or performing checks and services inside the air conditioner. Death on contact may result if personnel fail to observe safety precautions.
	●		Screens, guards, grilles, and covers	Check for cracks, breaks, bends, and othe physical damage. Lubricate moving parts requi red.
	●		Fresh air filter	Remove filter and inspect for dust, dirt, physical damage.
	●		Conditioned air filter	Remove filter and inspect for dust, dirt, physical damage.
	●		Mist eliminator	Remove mist eliminator and inspect for du dirt, and physical damage.
		●	Evaporator fans and motor	Inspect fan and motor for dust, dirt, and other contamination. Check that fans are secure on motor shaft. Rotate motor by h Motor must turn smoothly, with no bindin
		●	Condenser fan and motor	Inspect fan and motor for dust, dirt, and other contamination. Check that fan is securely mounted on motor shaft. Turn mo by hand. Motor must turn freely, with no binding.

Item No.	Interval Q	Interval S	Item to be inspected	Procedure: Check for and have repaired, replaced, cleaned, or adjust as necessary Perform all operator PMCS first
7		●	Evaporator coil	Inspect coil for foreign material, physi damage, and loose mounting.
8		●	Condenser coil	Inspect coil for foreign material, physi damage, and loose mounting.
9	●		Condensate drip pan, drain tubes, and drain trap	Clean dust and dirt from drip pan. Pour approximately 1 cup of water into drip p Water must flow through tubes and past c trap.
10	●		Fabric cover	Inspect cover for tears, cracks, and oth signs of deterioration.
11	●		Air conditioner controls and wiring	Check that all controls operate freely. wiring harness for loose or broken wires insulation, or connections CAUTION Do not check operation in COOL mode until after input power has been reconnected for a sufficient time eliminate any danger of liquid refrigerant accumulation in the compressor cylinder. Except in extremely cold conditions, if inpu power has been disconnected for a period of less than 4 hours, an equal warmup period should be allowed. If the disconnected peri has been more than 4 hours, a full 4-hour warmup period is necessary.
12	●		Air conditioner	Operate air conditioner and check for p operation in both heating and cooling m
13	●		Sight glass	With air conditioner operating in COOL check that sight glass moisture indicat green in color. If indicator is yellow refrigerant system is moisture contamin If bubbles are present in sight glass, is low on refrigerant.

4-12. USE OF TROUBLESHOOTING TABLE

ble 4-2 contains troubleshooting information useful to organizational maintenance technicians in dia g and correcting malfunctions or unsatisfactory operation of the air conditioner.

a. The troubleshooting table lists the common malfunction symptoms and unsatisfactory perforn characteristics technicians are most likely to encounter; test and inspection steps to be followed to mine the cause; and the corrective action(s) that should be performed for each possible cause li

b. The technician should first find the malfunction symptom or unsatisfactory performance characteri the table which most closely describes the immediate situation; then perform the test and inspec and corrective action steps in the order in which they are listed.

c. This manual cannot list all possible situations which may be encountered, nor can it list all test a spection, and corrective action steps which may be taken. If a condition is encountered which can resolved within the capabilities and experience of organizational maintenance personnel, assis should be requested from direct support maintenance.

Table 4-2 — TROUBLESHOOTING

ALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION
AIR CONDITIONER WILL NOT START IN ANY MODE.
Step 1. Check to see if the circuit breaker is tripped. Pull out, then push in the circuit breaker reset knob.
Step 2. Check to see if input power has been disconnected. Connect input power.
CAUTION If input power has been disconnected for an unknown period of time, do not start in COOL mode until it has been reconnected for a minimum of four hours.
WARNING Disconnect input power before performing internal electrical troubleshooting. Voltages used can be lethal.
Step 3. Check for loose or damaged electrical connectors or damaged wires in wiring harnesse Tighten or replace connectors, or repair damaged wires.
Step 4. Check for blown fuses. Test fuses (para 4-25.d.(6).). Replace defective fuses.
Step 5. Check operation of the auxiliary switch in the circuit breaker.

Step 6. Check operation of the control power transformer.
Test transformer (para 4-25.d.(1).). Replace transformer if defective.
Step 7. Check operation of RFI filter and d.c. rectifier assembly.
Test filters and rectifier (para 4-25.d.(2).). Replace defective filter(s) or rectifier.
Step 8. Check all terminals and internal wiring within the junction box for tightness and da
Tighten terminals, or repair wiring as necessary.
Step 9. Check operation of the mode selector switch.
Test switch (para 4-24.d.). Replace switch if defective.

2. EVAPORATOR FAN STARTS IN COOL MODE, BUT CONDENSER FAN DOES NOT, AND COM DOES NOT START AFTER TIME DELAY.
Step 1. Check to see if high- or low-pressure cutout switch is tripped.
Press, then release reset buttons.

WARNING

Disconnect input power before performing internal electrical troubleshooting. Voltages u can be lethal.

Step 2. Check for loose or damaged electrical connectors, or damaged wires in wiring har
Tighten or replace connectors, or repair damaged wires.
Step 3. Check operation of the compressor motor thermal overload, overcurrent protector.
Test protector (para 5-28.b.(6).). Contact direct support maintenance for replacement if the protector is open.
Step 4. Check operation of the mode selector switch.
Test switch (para 4-24.d.). Replace switch if defective.

3. EVAPORATOR AND CONDENSER FANS BOTH RUN, BUT COMPRESSOR DOES NOT START AI DELAY.

WARNING

Disconnect input power before performing internal electrical troubleshooting. Voltages us can be lethal.

Step 1. Check for loose or damaged electrical connectors, or damaged wires in wiring har
Tighten or replace connectors, or repair damaged wires.
Step 2. Check operation of the time delay relay.
Test relay (para 4-25.d.(5).). Replace relay if defective.
Step 3. Check operation of the compressor motor relay (K9).
Test relay (para 4-25.d.(4).). Replace relay if defective.
Step 4. Check operation of the circuit breaker primary contacts.
Test circuit breaker (para 4-25.d.(3).). Replace circuit breaker if defective.
Step 5. Check operation of the compressor motor.
Test motor (para 5-28.b.(7).). Contact direct support maintenance for compress ment if the motor is defective.

4. AIR CONDITIONER STOPS COMPLETELY DURING COOL MODE OPERATION.
Step 1. Check to see if the circuit breaker is tripped.

CAUTION

Wait at least five minutes before restarting in COOL mode.

Step 2. Check to be sure condenser fan starts immediately when a restart in COOL mode is made. condenser fan does not start, test as follows:

WARNING

Disconnect input power before performing internal electrical troubleshooting. Voltages used can be lethal.

a. Test condenser fan motor relay (K7) (para 4-25.d.(4).). Replace relay if defective.
b. Test condenser fan motor (para 4-32.b.(5).). Contact direct support maintenance if mo defective.

Step 3. Check to be sure there is no restriction to air flow through the condenser section. Clean all obstructions from condenser intake screen, condenser coil, and condense guard.

CAUTION

If circuit breaker trips again soon after restart in the COOL mode, do not attempt another restart, and contact direct support maintenance for refrigeration system troubleshooting.

COMPRESSOR AND CONDENSER FAN STOP DURING COOL MODE OPERATION, BUT EVAPOR FAN CONTINUES TO RUN.

Step 1. Check to see if the high- or low-pressure cutout switch is tripped. Press, then release tripped reset button.

CAUTION

Wait at least two minutes before restarting in COOL mode. If either pressure cutout switch trips soon after a restart is made, do not attempt another restart, and contact direct support maintenance for refrigeration system troubleshooting.

EVAPORATOR FAN DOES NOT START, OR STOPS DURING OPERATION, IN ANY OPERATING MO

Step 1. Check operation of evaporator fan motor relay (K8).

WARNING

Disconnect input power before performing internal electrical troubleshooting. Voltages used can be lethal.

Test relay (para 4-25.d.(4).). Replace relay if defective.

Step 2. Check operation of evaporator fan motor.
Test motor (para 4-27.b.(6).). Contact direct support maintenance if motor is defect
Step 3. Check operation of mode selector switch.
Test switch (para 4-24.d.). Replace switch if defective.

EXCESSIVE NOISE WHEN COMPRESSOR STARTS.

CAUTION

If a knocking or hammering sound is heard when the compressor starts, turn the mode selecto switch to OFF, immediately. Such noise is usually caused by liquid refrigerant in the com pressor, which can seriously damage or destroy the compressor.

Step 1. Check to see if input power has been disconnected.
Connect input power and wait a minimum of four hours before starting in COOL
Step 2. Check operation of compressor heater and compressor heater thermostat.

WARNING

Disconnect input power before performing internal electrical troubleshooting. Voltages use can be lethal.

Test heater and thermostat (para 5-27.b.(5).). Replace either or both if defective.

CAUTION

If heater or thermostat were defective, wait at least four hours after reconnecting input powe before starting in COOL mode. If noise persists, contact direct support maintenance fo refrigeration system troubleshooting.

EXCESSIVELY NOISY OPERATION.
Step 1. Isolate source of noise as near as possible, both by ear and touch.
Listen and feel at both the front and back of the cabinet.
Step 2. Check fans for looseness or damage, and for rotational clearance.
Tighten loose fans, adjust for rotational clearance, or contact direct support mainte

Step 3. Check all internal components for looseness, vibration, and security.
Tighten, adjust, and secure as necessary.

9. NO HEAT IN EITHER HI HEAT OR LO HEAT MODE.
Step 1. Check for loose or damaged electrical connectors, or damaged wires in wiring harnes

WARNING

Disconnect input power before performing internal electrical troubleshooting. Voltages used can be lethal.

Tighten or replace loose or damaged connectors, or repair damaged wires.
Step 2. Check operation of heater thermostat.
Test thermostat (para 4-28.c.). Replace thermostat if defective.
Step 3. Check operation of mode selector switch.
Test switch (para 4-24.d.). Replace switch if defective.

10. HEAT IN HI HEAT MODE, BUT NOT IN LO HEAT MODE.
Step 1. Check for loose or damaged electrical connectors, or damaged wires in wiring harnes

WARNING

Disconnect input power before performing internal electrical troubleshooting. Voltages used can be lethal.

Tighten or replace loose or damaged connectors, or repair damaged wires.
Step 2. Check operations of heater relay (K1).
Test relay (para 4-25.d.(4).). Replace relay if defective.
Step 3. Check operation of temperature thermostat control.
a. Inspect sensing bulb and capillary for damage or leakage. Replace entire control damaged or leaking.
b. Test switch in temperature thermostat (para 4-24.e.). Replace entire control if d
Step 4. Check operation of mode selector switch.
Test switch (para 4-24.d.). Replace switch if defective.

11. REDUCED HEATING CAPACITY.
Step 1. Check airflow out of evaporator discharge grille. If airflow volume is low:
a. Adjust evaporator intake grille louvers.
b. Clean and service, or replace, conditioned air filter element (para 4-20.).
c. Clean and service, or replace, mist eliminator (para 4-22.).
d. Clean evaporator coil, and the entire evaporator section.
Step 2. Check adjustment of fresh air damper and/or CBR filter, if installed.
Adjust properly.
Step 3. Check operation of heater thermostat.

WARNING

Disconnect input power before performing internal electrical troubleshooting. Voltages used can be lethal.

Test thermostat (para 4-28.c.). Replace thermostat if defective.

Step 4. Check operation of individual heater elements.
Test each element (para 4-29.c.). Replace defective elements.

Step 5. Check operation of temperature thermostat control.
a. Inspect sensing bulb and capillary for damage or leakage. Replace entire control if b damaged or leaking.
b. Test switch in temperature thermostat (para 4-24.e.). Replace entire control if defe

REDUCED COOLING CAPACITY.

Step 1. Check conditions of refrigerant displayed in the sight glass.
a. If the color is yellow or a light hue of chartreuse, or if numerous bubbles appear, tu air conditioner OFF, and contact direct support maintenance for refrigeration syste vicing.
b. If the color is green or a dark hue of chartreuse, but has a milky appearance, or mor an occasional bubble appears, thoroughly clean the condenser intake screen, cond fan guard, condenser coil, and the entire condenser section to remove all obstruc

Step 2. Check airflow out of evaporator discharge grille. If airflow volume is low:
a. Adjust evaporator intake grille louvers.
b. Clean and service, or replace conditioned air filter element (para 4-20.).
c. Clean and service, or replace, mist eliminator (para 4-22.).
d. Clean evaporator coil, and the entire evaporator section.

Step 3. Check adjustment of fresh air damper and/or CBR filter, if installed.
Adjust properly.

Step 4. Check operation of the temperature thermostat control.
a. Inspect sensing bulb and capillary for damage or leakage. Replace entire control if damaged or leaking.
b. Test switch in temperature thermostat (para 4-24.e.). Replace entire control if defe

Step 5. Contact direct support maintenance for further refrigeration system troubleshooting.

Section VI

MAINTENANCE PROCEDURES

13. GENERAL

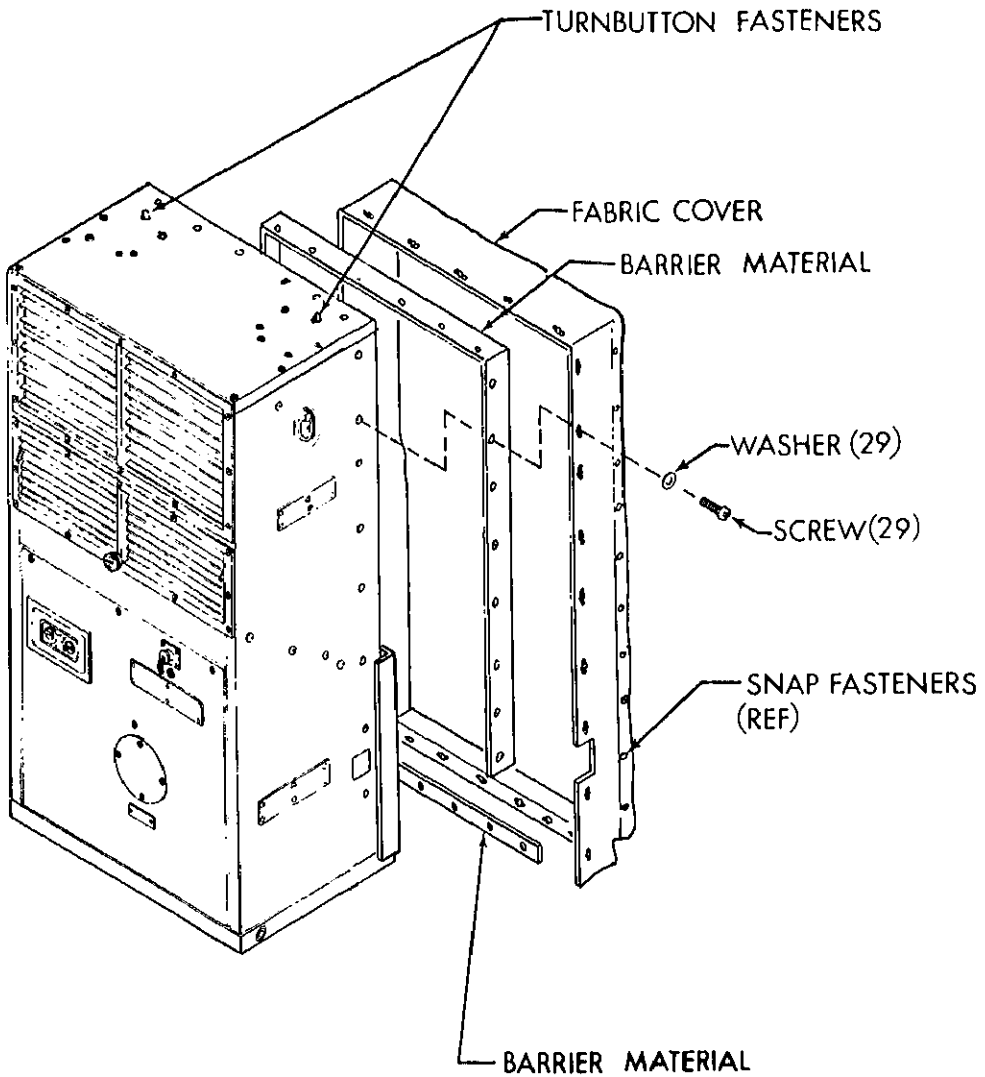
procedures in this section have been arranged in the order in which the items appear in the organiza maintenance level column on the Maintenance Allocation Chart (MAC) which is provided in Apper -by-step-procedures have been provided for all actions authorized to be performed by organiza ntenance in the order in which they appear on the MAC. Actions authorized to be performed by dire eral support maintenance have been duly noted; step-by-step procedures for these actions may be fo

a. Description. The fabric cover is made of vinyl impregnated nylon cloth. Small aluminum rods into the hems on the edges of the cover that fit around the cabinet to give it shape. The back fl cover is secured in position when closed by means of snap fasteners at the sides and bottom. Tw with eyelets in the ends are sewn into the top of the cover. When the cover flap is rolled up, the are used to secure it in the stowed position by wrapping them around the roll and connecting th to turnbutton fasteners provided on the top of the cabinet. Strips of barrier material are installed the cover and the cabinet on the top, sides and bottom to form a weather seal.

b. Removal. Remove the fabric cover as follows:

(1) Roll the back flap down into the closed position and close all 26 snap fasteners.

(2) Remove the 29 screws and washers that attach the fabric cover to the cabinet.



tool, between the cover and the casing to separate them. Be careful to not damage th material strips.

(4) Separate the barrier material strips from the fabric cover, or remove them from the casing. I reinstallation.

c. Cleaning. Wash the fabric cover and the edges of the casing from which it was removed using a of fresh water and a mild detergent. A soft scrubbing brush may be used to remove caked Thoroughly rinse with fresh water and air dry.

d. Inspection/Repair. Inspect for rips, cuts, tears, or punctures in the fabric, and for damaged o snap fasteners and eyelets. Inspect barrier material strips for general condition. Refer require repair or replacement of the fabric cover and/or replacement of barrier material strips to direc maintenance.

e. Lubrication. Apply a silicone spray lubricant or wax stick to the snap fasteners, if they are difficu and close. Apply a few drops of light oil to the two turnbutton fasteners on the top of the c necessary.

f. Installation. Install the fabric cover as follows:

(1) Place the barrier material strip around the top and sides of the cabinet in the same pos which it was removed. Be sure the holes are alined with the screw holes in the cabinet.

(2) Carefully slide the fabric cover over the cabinet and barrier material strips. Be sure th straps are hanging down the inside of the roll up flap.

(3) Aline the eyelets in the fabric cover with the holes in the barrier strip and the screw ho cabinet, then install the 23 screws and washers through the top and side eyelets.

(4) Insert and aline the barrier material strip between the bottom of the fabric cover and th base, then install the six screws and washers through the bottom eyelets.

(5) If the air conditioner is to be returned to normal operation, open the snap fasteners, roll up flap, and secure it with the stowing straps.

NOTE

If the air conditioner is to be operated with the fabric cover removed, be sure to install all 2 screws and washers. This will protect the threads in the rivnuts and prevent air leaks. In add tion, the six screws in the bottom also serve to mount the lower back panel and condenser fa mounting bracket to the cabinet base.

4-15. TOP PANEL ASSEMBLY

See figure 4-12.

a. Description. The top panel is an assembly that encloses the top of the air conditioner cabinet. Fl the sides and back of the top panel overlap outside the side panels and upper back panel of th The flange on the front of the top panel serves as a mounting surface for the top of the evapo charge grille. Three rivnuts are installed in the front flange for the top evaporator discharge gril ing screws. Six rivnuts are installed near the back of the top plate for the top fabric cover screws. Gasket strips are glued to the bottom of the top panel to form a seal with the evaporat

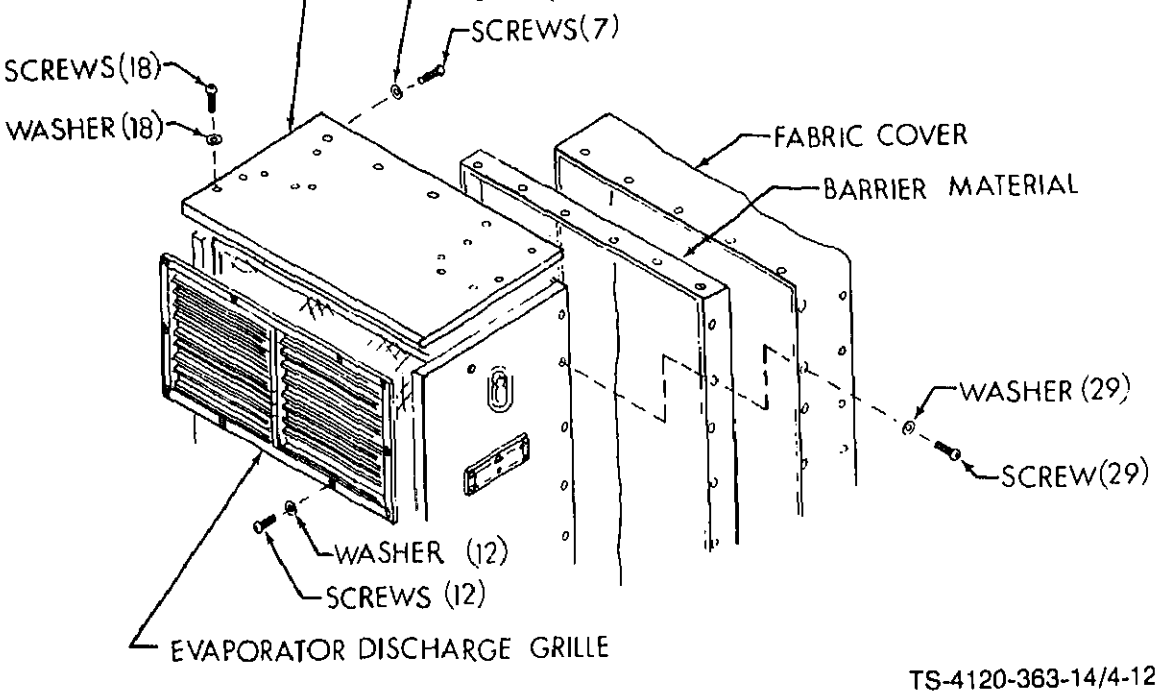


Figure 4-12. Top Panel

Removal. Remove the top panel assembly as follows:

(1) If the air conditioner is in a typical installation (setting in an opening in an exterior wall), remove th filler plate above the cabinet.

(2) Remove the fabric cover from the back of the cabinet as follows:

(a) Roll the back flap down into the closed position and close all 26 snap fasteners.

(b) Remove the 29 screws and washers that attach the fabric cover to the cabinet.

(c) Slide the fabric cover off the cabinet by alternately pulling or pushing at the corners. If the cov or barrier material is stuck to the casing, carefully insert the blade of a putty knife, or similar flex ble tool, between the cover and the casing. Be careful to not damage the barrier material.

(3) Remove the seven screws and washers that attach the back flange of the top panel to the upper ba panel of the casing.

(4) Remove the 12 mounting screws and washers, and remove the evaporator discharge grille.

(5) Remove the 18 screws and washers that attach the top panel to the top of the side panels of t casing and the evaporator fan air ducts.

(6) Lift the top panel straight up to prevent damage to insulation and gasket strips, and remove.

) Carefully place the panel in position and lower straight down to avoid damage to insulation a gasket strips.

) Aline the holes and install the 18 screws and washers through the top panel.

) Install the evaporator discharge grille and 12 mounting screws and washers.

) Install the seven screws and washers that attach the black flange of the top panel to the upper ba panel of the casing.

) Install the fabric cover as follows:

(a) Place the barrier material strip around the top and sides of the cabinet in the same position fr which it was removed. Be sure the holes are alined with the screw holes in the cabinet.

(b) Carefully slide the fabric cover, the casing and barrier material strip. Be sure the stowing stra are hanging down the inside of the roll up flap.

(c) Aline the eyelets in the fabric cover with the holes in the barrier strip and the screw holes in cabinet, then install the 23 screws and washers through the top and side eyelets.

(d) Insert and aline the barrier material strip between the bottom of the fabric cover and the cabi base, then install the six screws and washers through the bottom eyelets.

(e) If the air conditioner is to be returned to normal operation, open the snap fasteners, roll up back flap, and secure it with the stowing straps.

) Install the filler plate above the top of the cabinet, if applicable.

LOWER FRONT PANEL See figure 4-13.

escription. The lower front panel is an assembly which covers the front of the compressor/conden ection of the cabinet. Openings in the upper left and right hand sides of the panel allow the con nobs on the control panel and the input power connector to protrude through the panel, respectively affle covers an opening in the center of the panel that is designed to allow access to reset the circ reaker. A gasket glued to the front of the panel provides a seal for the baffle. Gasket strips are glue e back of the panel around the openings to provide seals between the front panel and the control pa nd the input power connector bracket. Insulation material is both glued and mechanically attached e remainder of the back of the front panel. A gasket strip is glued to the bottom of the front pane rovide a seal between the front panel and the cabinet base.

NOTE

Three other alternate locations have been provided for location of the input power connector. If an alternate location is used, a blank cover plate will be installed on the bracket at the front panel location.

emoval. Remove the lower front panel as follows:

) Disconnect input power at its source.

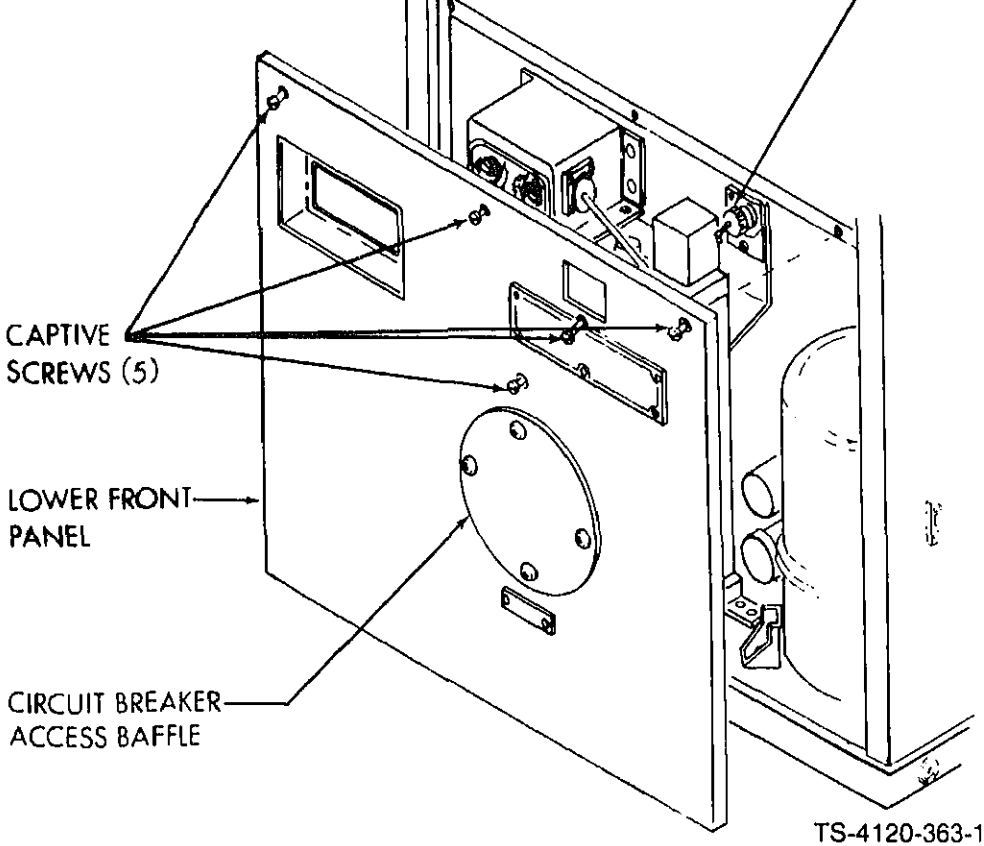


Figure 4-13. Lower Front Panel

WARNING

Never remove the input power cable connector from the cabinet with power in the cable. Serious or possibly fatal shock may occur. Arcing may also damage the pins in the connectors.

Figure 4-13. Lower Front Panel

(2) Disconnect the input power cable connector from the connector on the unit, if the front location is used.

(3) Loosen the five captive panel fastener screws.

(4) Pull the top of the panel forward a few inches and then lift straight up to clear the flange on tl tom. Be careful to not damage the gasket strip on the bottom of the panel.

c. Cleaning. Carefully wipe or vacuum all dust and dirt off the inside surfaces of the panel. Use care damage the insulation or gasket strips.

tallation. Install the lower front panel as follows:

Set the bottom of the panel in position so that the flange is inside the lip on the cabinet base.

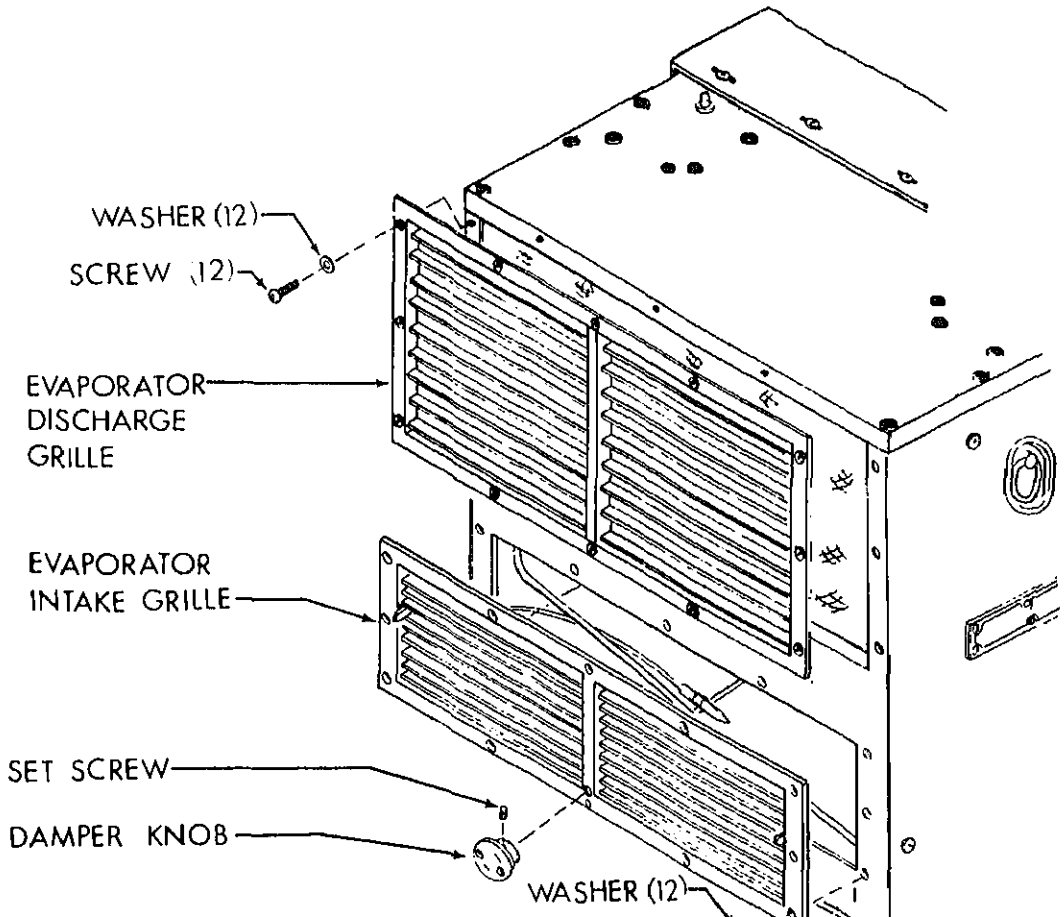
Push the top of the panel back into position and tighten the five captive panel fastener screws.

Connect the input power cable connector, if the front panel location is used.

Reconnect input power at its source.

GRILLES See figure 4-14.

scription. There are two grilles in the upper part of the front of the cabinet. The one nearest the top evaporator discharge grille; the other is the evaporator intake grille. The discharge grille is divid o left and right hand louver sections, each containing 15 individually adjustable louvers. Spring te n on the pivot pins on each end of each louver provide enough friction to hold them in position again flow pressure. The intake grille is very similar to the discharge grille except that each louver secti ntains only eight louvers, and all louvers in each section are glued to the back of the perimeter of ea lle to provide seals.



(1) Remove the 12 screws and washers that mount the discharge grille to the cabinet.

(2) Remove the discharge grille.

(3) Loosen the setscrew and remove the front fresh air damper control knob.

(4) Remove the 12 screws and washers that mount the intake grille to the cabinet.

(5) Remove the intake grille.

c. Cleaning. Wipe or vacuum all dust and dirt off the louvers and the rest of the inside of the grill careful to not damage the gasket strips.

d. Inspection/Repair. Inspect each grille for general condition and proper operation. Bent louvers usually be straightened with the fingers. Refer requirements for further repair or replacement to d support maintenance.

e. Lubrication. Apply a few drops of light oil to all pivot points and bearing surfaces of the louvers. Wi blot up all excess oil with a cloth or paper towel.

f. Installation. Install the grilles as follows:

(1) Place the discharge grille in position, aline the holes, and install the 12 mounting screws washers.

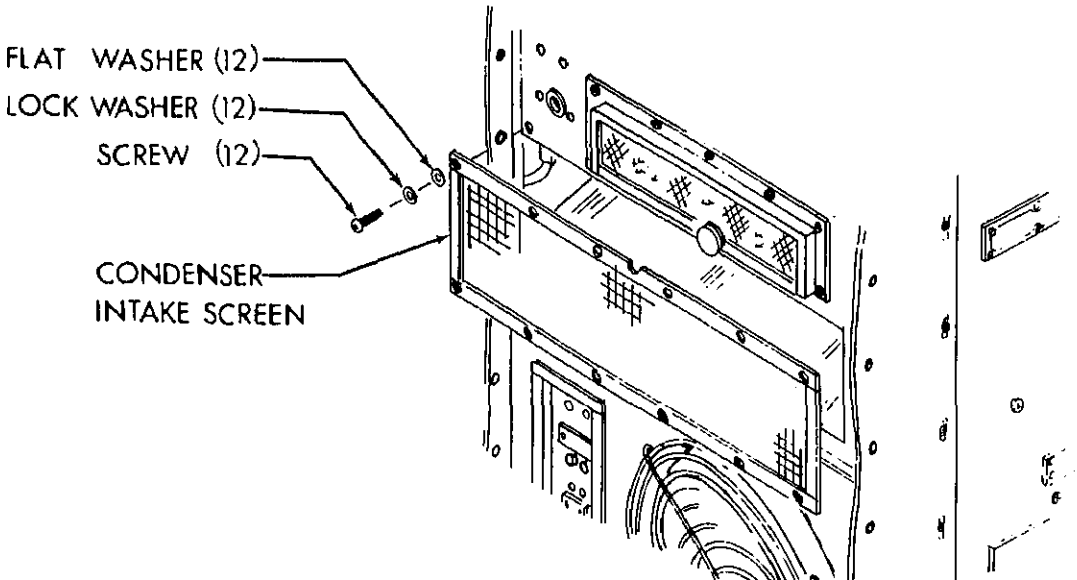
(2) Place the intake grille in position, aline the holes, and install the 12 mounting screws and was

(3) Install the front fresh air damper knob, aline the setscrew with the flat side of the shaft, and tig the setscrew.

4-18. CONDENSER INTAKE SCREEN

See figure 4-15.

a. Description. This screen is made of a fine mesh, corrosion resistant steel material mounted in a w steel frame.



. **FRESH AIR FILTER** | See figure 4-16.

Description. The fresh air filter element consists of a media of layers of aluminum wire cloth mounte an aluminum frame. The frame of the filter element is clearly marked with an arrow to show prope flow direction. A mounting frame is used to attach the filter to the back of the cabinet over the openir the fresh air damper.

Removal. Remove the seven screws and lock washers that attach the filter mounting frame to the cab and remove the frame and filter element.

NOTE

Notice that the two screws from the lower corners are slightly shorter than the other five.

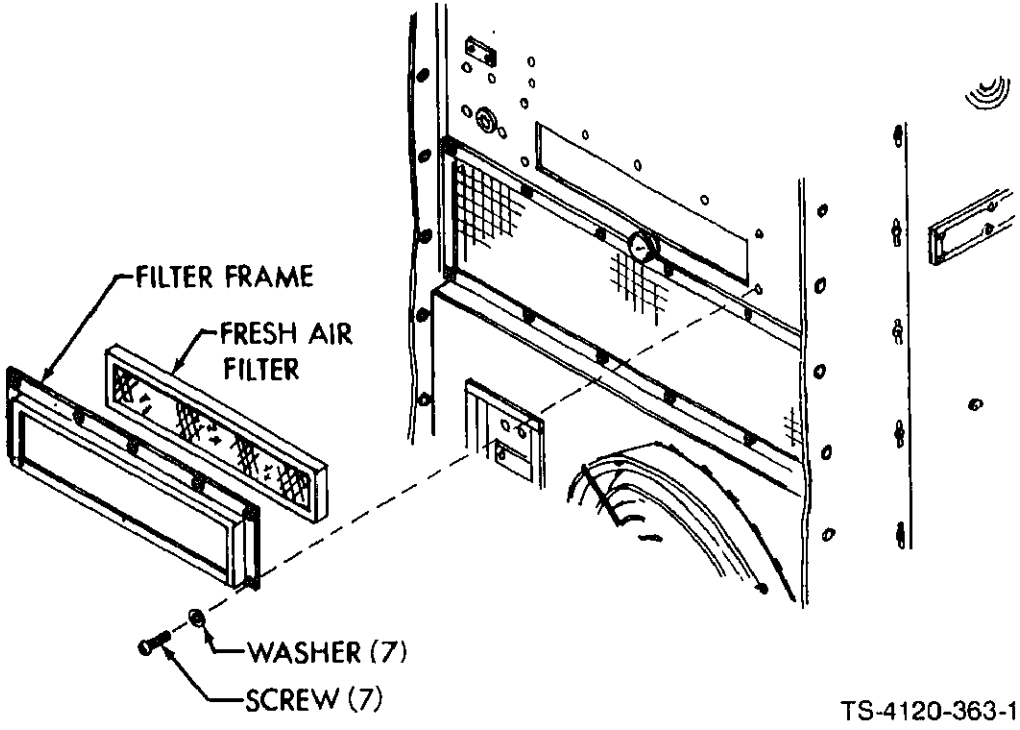


Figure 4-16. Fresh Air Filter

caked deposits. Rinse in fresh water or a clean bath of dry cleaning solvent; shake dry.

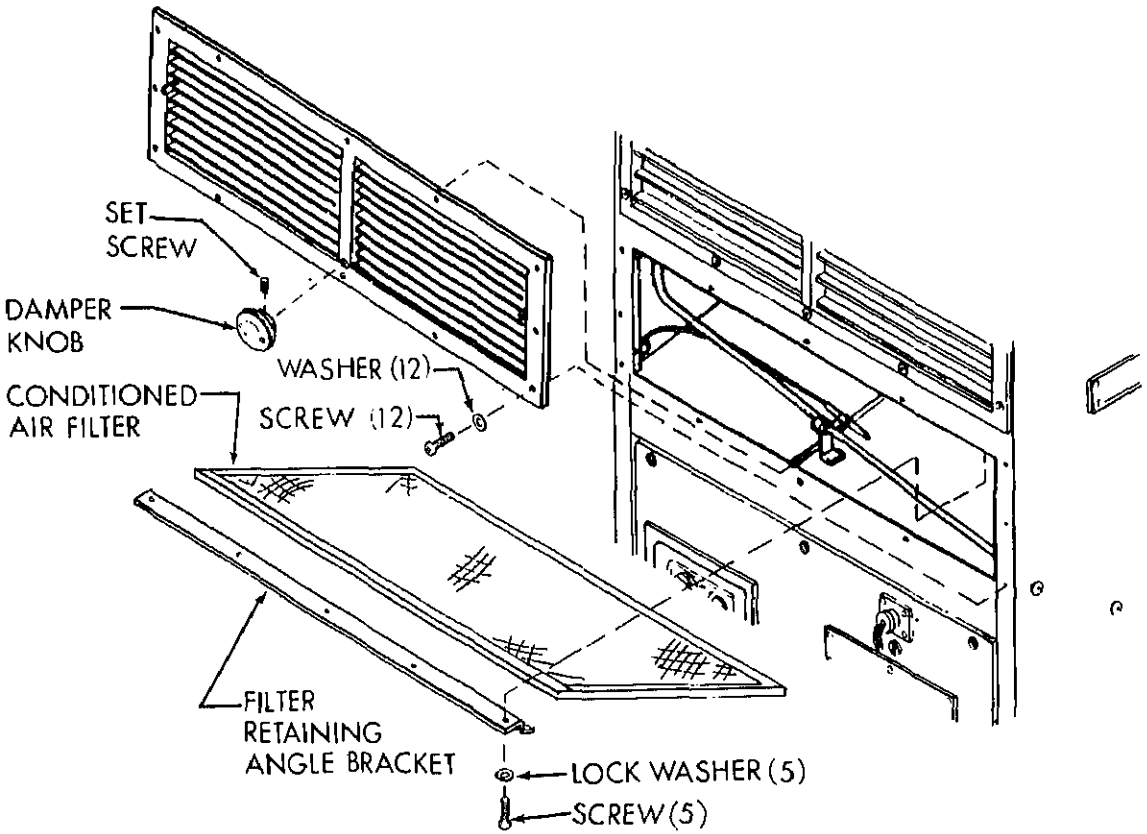
Inspection/Replacement. Inspect for general condition and obvious damage to the element or mountin frame. Replace if damaged.

Servicing. Apply coater (Item 1, Section II, Appendix C) to the media in the filter element.

Installation. Position the filter element in the mounting frame, making sure the directional air flow arro is pointed in toward the cabinet. Position the frame on the cabinet, aline holes, and install the seve mounting screws and lock washers. Be sure the two shorter screws are installed in the holes in the lowe corners.

0. CONDITIONED AIR FILTER See figure 4-17.

Description. The conditioned air filter element consists of a media of layers of aluminum wire clot mounted in an aluminum frame. The frame is clearly marked with an arrow to show proper air flow direc tion. The filter element is located inside the cabinet, behind the evaporator intake grille. The back an sides of the filter element fit into a frame built into the cabinet and a removable retaining angle bracket installed in the front to hold it in place.



(3) Remove the five screws and lock washers from the filter retaining angle bracket, and remov bracket and the conditioned air filter element.

WARNING

Clean parts in a well ventilated area. Avoid inhalation of solvent fumes and prolonged exposure of skin to cleaning solvent. Wash exposed skin thoroughly. Dry cleaning solvent (Fed. Spec. P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 50°C).

Wear eye protection when blowing solvent from parts. Air pressure should not exceed 30 psig (2.1 lkg/cm^2).

Cleaning. Immerse the filter element in a solution of water and a detergent, or dry cleaning solvent Spec. P-D-680). Agitate until all dust and dirt are removed, using a soft brush, if necessary, to re caked deposits. Rinse in fresh water or a clean bath of dry cleaning solvent; shake dry.

Inspection/Replacement. Inspect for general condition and obvious damage to the element. Repla damaged.

Servicing. Apply coater (Item 1, Section II, Appendix C) to the media in the filter element.

Installation. Install the conditioned air filter as follows:

(1) Place the filter element in the mounting frame making sure the directional air flow arrow is poi upward.

(2) Place the filter retaining angle bracket in position on the front of the filter element and alin mounting holes.

(3) Install the five mounting screws and lock washers.

(4) Install the evaporator intake grille and 12 mounting screws and washers.

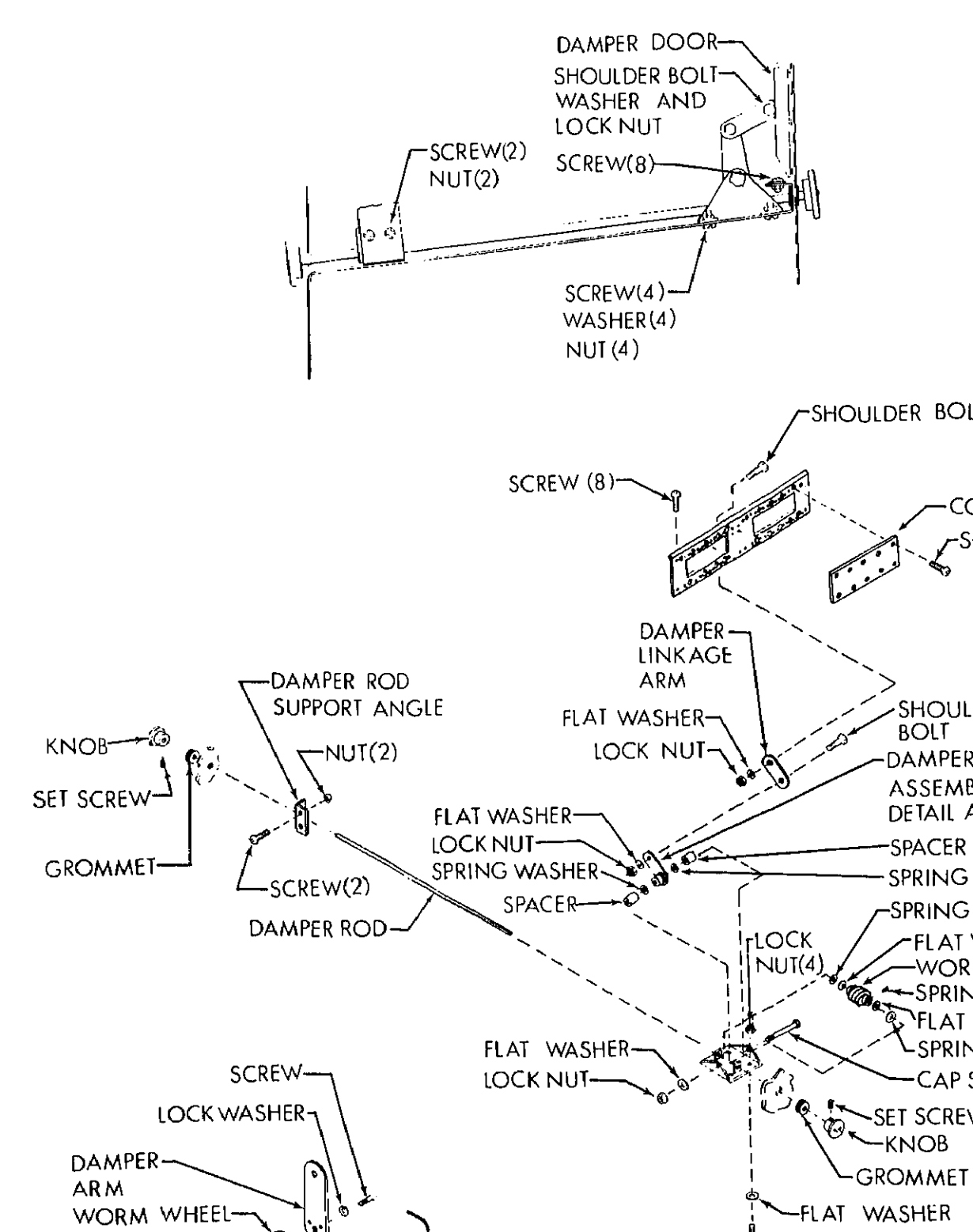
(5) Install the front fresh air damper control knob, aline the setscrew with the flat on the shaft tighten the setscrew.

1. FRESH AIR DAMPER See figure 4-18.

Description. The fresh air damper consists of a hinged door and an operating mechanism through v the door can be adjusted as desired. The hinged door is located inside the evaporator section cabinet, directly behind the fresh air filter. The shaft of the operating mechanism extends through th tom center of the evaporator intake grille in the front and through the bottom center of the upper panel, just below the fresh air filter frame, in the back. A control knob is installed on each end of the

Removal. Remove the fresh air damper as follows:

(1) Remove the seven screws and lock washers that attach the fresh air filter mounting frame remove the frame and filter element. See figure 4-16.


DAMPER DOOR
SHOULDER BOLT
WASHER AND
LOCK NUT
SCREW(2)
NUT(2)
SCREW(8)
SCREW(4)
WASHER(4)
NUT(4)
SHOULDER BOL
SCREW (8)
DAMPER
LINKAGE
ARM
DAMPER ROD
SUPPORT ANGLE
KNOB
NUT(2)
FLAT WASHER
LOCK NUT
SHOUL
BOLT
DAMPER
ASSEMB
DETAIL A
SET SCREW
FLAT WASHER
LOCK NUT
SPRING WASHER
SPACER
SPACER
SPRING
SPRING
GROMMET
SCREW(2)
DAMPER ROD
LOCK
NUT(4)
FLAT
WOR
SPRIN
FLAT
SPRIN
FLAT WASHER
LOCK NUT
CAP
SCREW
LOCK WASHER
SET SCREW
KNOB
DAMPER
ARM
WORM WHEEL
GROMMET
FLAT WASHER

) Loosen the setscrew and remove the front fresh air damper control knob. See figure 4-17.

) Remove the 12 mounting screws and washers, and remove the evaporator intake grille. See figu 4-17.

) Remove the five screws and lock washers from the filter retaining angle bracket, and remove t retaining bracket and the conditioned air filter element. See figure 4-17.

) Remove the nut, washer, and screw that attach the actuator arm to the bracket on the damper do

) Remove the eight screws that attach the damper door hinges to the cabinet partition and remove t damper door.

) Remove the two nuts and screws that attach the shaft support bracket to the condensate drain tu support bracket.

0) Remove the four nuts, washers, and screws that attach the damper door actuating assembly brac to the cabinet partition. The nuts are removed through the fresh air filter opening; the screws a washers through the condenser intake screen opening.

1) Pull the assembly straight forward until the back end of the shaft is clear of the grommet in the ba panel, then remove the entire assembly through the evaporator intake opening.

isassembly. Disassemble the actuating mechanism as follows:

) Remove the attaching nut, washer, and screw, and the actuator arm from the rocker arm.

2) Remove the nut, washer, and screw from the assembly bracket, and remove the worm wheel g and rocker arm assembly and the two spacers and spring washers.

3) Remove the three attaching screws and washers, and remove the rocker arm from the worm wh gear.

4) Remove the spring pin that attaches the worm gear to the shaft, pull the shaft out of the assem bracket, and remove the worm gear, and the two spring washers and flat washers.

WARNING

Clean parts in a well ventilated area.

Avoid inhalation of solvent fumes and prolonged exposure of skin to cleaning solvent. Wash exposed skin thoroughly.

Dry cleaning solvent (Fed. Spec. P-D-680) used to clean parts is potentially dangerous to personnel and property.

Do not use near open flame or excessive heat. Flash point of solvent is 100° to 138°F (38° to 50°C).

Wear eye protection when blowing solvent from parts. Air pressure should not exceed 30 psig (2.1kg/cm^2).

leaning/Inspection. Wipe all components clean, or wash in dry cleaning solvent (Fed. Spec. P-D-6 horoughly inspect all components, including the damper door and its hinges, for wear or dama

provide lubrication.

(2) Position the two flat washers and spring washers, and the worm gear in the proper order in the as sembly bracket, insert the shaft, aline the hole in the worm gear with the hole in the shaft, and instal the spring pin.

(3) Position the rocker arm on the worm wheel gear and install the three attaching washers and screws

(4) Position the shaft so that the flats at the ends are parallel with the base of the assembly bracket.

(5) Position the worm wheel gear/rocker arm assembly, and the two spacers and spring washers in the assembly bracket in the proper order with the center line of the rocker arm perpendicular to the shaft then install the screw, washer, and nut through the bracket. Tighten the lock nut sufficiently to flatten the spring washers and apply a light friction drag.

(6) Rotate the shaft to check proper operation of the mechanism.

(7) Install the actuator arm and attaching screw, washer, and nut on the rocker arm.

Installation. Install the fresh air damper as follows:

(1) Insert the actuating assembly into the cabinet through the evaporator intake opening and feed the back end of the shaft through the grommet in the back panel.

(2) Aline the assembly bracket with the mounting holes in the cabinet partition, and install the four attaching screws, washers, and nuts.

(3) Slip the shaft support bracket on the shaft, position it on the condensate drain tube support bracket and install the two attaching screws and nuts.

(4) Sparingly apply a few drops of light oil to the damper door hinges; wipe off all excess oil.

(5) Insert the damper door into position and install the eight screws that attach the hinges.

(6) Install the screw, washer, and nut that attach the actuator arm to the bracket on the damper door

(7) Rotate the shaft to check proper operation of the fresh air damper door.

(8) Install the conditioned air filter element, the filter retaining angle bracket, and the five attaching lock washers and screws.

(9) Install the evaporator intake grille and the 12 attaching screws and washers.

(10) Install the front fresh air damper control knob, aline the setscrew with the flat on the shaft, and tighten the setscrew.

(11) Install the fresh air filter element, the filter frame, and the seven attaching screws and lock washers

(12) Install the condenser intake screen and the 12 attaching screws, flat washers, and lock washers

(13) Install the back fresh air damper control knob, aline the setscrew with the flat on the shaft, and tighten the setscrew.

. Description. The mist eliminator filter element consists of a media of layers of herring bone me alumninum cloth between front and back screens, mounted in aluminum frame which incorporates thr horizontal drain channels. One edge of the frame is clearly marked TOP to insure the drain channels a properly oriented. The front and back screens are tied together through the media between the dra channels to maintain a uniform thickness. The element is installed in a channel guide built into t cabinet directly in front of the evaporator coil. The element can be removed only with the top par assembly removed from the cabinet by sliding it vertically up out of the guides.

. Removal. Remove the mist eliminator as follows:

(1) Remove the fabric cover as follows:

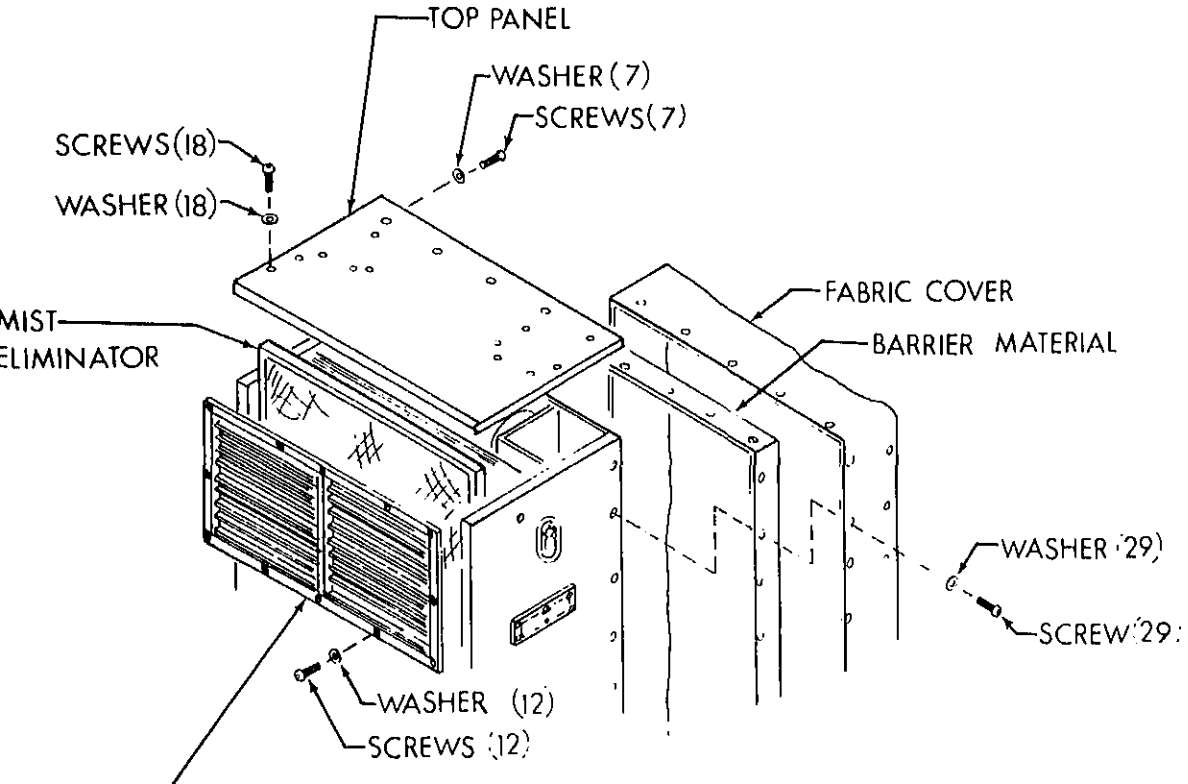
(a) Roll the back flap down into the closed position and close all 26 snap fasteners.

(b) Remove the 29 screws and washers that attach the fabric cover to the cabinet.

(c) Slide the fabric cover off the cabinet by alternately pulling or pushing at the corners. If the cov *or barrier material is stuck to the casing, carefully insert the blade of a putty knife, or similar fle* ble tool, between the cover and the casing. Be careful to not damage the barrier material.

(2) Remove the top panel assembly as follows:

(a) Remove the filler plate in the opening above the cabinet, if appropriate.



(d) Remove the 18 screws and washers that attach the top panel assembly to the side panels of th cashing and the evaporator fan air ducts.

(e) Lift the top panel straight up to avoid damage to the insulation and gaskets and then remove

(3) Remove the mist eliminator filter element by lifting it straight up and out of guides.

WARNING

Clean parts in a well ventilated area.
Avoid inhalation of solvent fumes and prolonged exposure of skin to cleaning solvent. Wash exposed skin thoroughly.
Dry cleaning solvent (Fed. Spec. P-D-680) used to clean parts is potentially dangerous to personnel and property.
Do not use near open flame or excessive heat. Flash point of solvent is 100%F to 138°F (38° to 50°C).
Wear eye protection when blowing solvent from parts. Air pressure should not exceed 30 psig (2.1 kg/cm^2).

Cleaning. Immerse the filter element in a solution of water and a detergent, or dry cleaning solvent (Fe Spec. P-D-680). Agitate until all dust and dirt are removed, using a soft brush, if necessary, to remov caked deposits. Rinse in fresh water or a clean bath of dry cleaning solvent; shake dry.

Inspection/Replacement. Inspect the element for general condition or damage. Replace if damaged.

Servicing. The mist eliminator does not require any type of servicing.

Installation. Install the mist eliminator filter element as follows:

(1) Slide the filter element down into the guides. Be sure the side marked TOP is up.

(2) Install the top panel assembly as follows:

(a) Carefully place the top panel assembly in position and lower straight down to avoid damage Insulation and gaskets.

(b) Aline holes and install the 18 screws and washers through to top panel.

(c) Install the evaporator discharge grille and the 12 mounting screws and washers.

(d) Install the seven screws and washers that attach the back flange of the top panel to the back the cabinet.

(e) Install the filler plate in the opening above the cabinet, if appropriate.

(3) Install the fabric cover as follows:

(a) Place the barrier material strip around the top and sides of the cabinet in the same position fro which it was removed. Be sure the holes are alined with the screw holes in the cabinet.

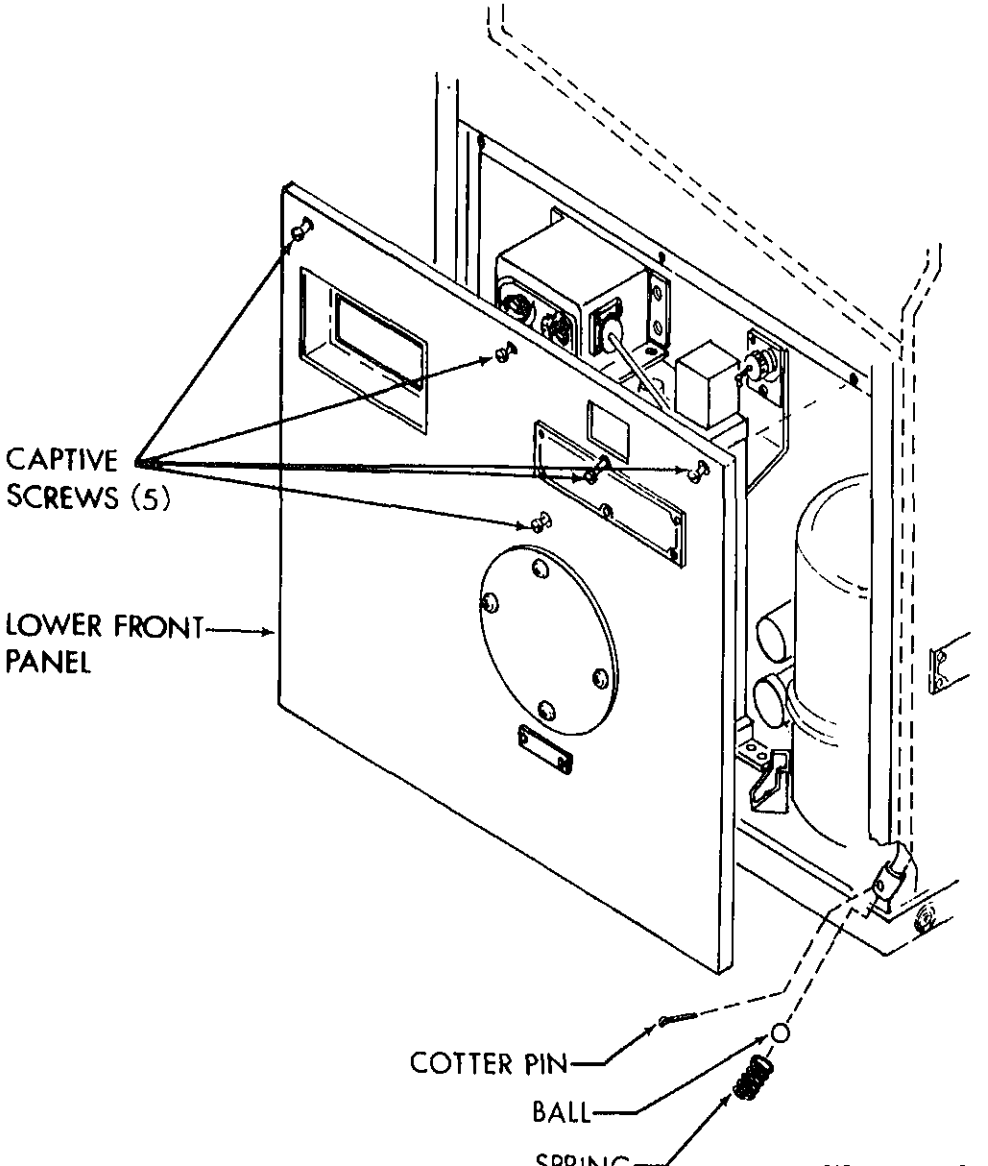
(b) Carefully slide the fabric

(d) Insert and aline the barrier material strip between the bottom of the fabric cover and the cabinet base. Then install the six screws and washers through the bottom eyelets.

(e) If the air conditioner is to be returned to normal service, open the snap fasteners, roll up the back flap, and secure it with the stowing straps.

ONDENSATE TRAP | See figure 4-20.

cription. The condensate trap is a ball check valve consisting of an aluminum seat which is welded to bottom end of the condensate drain line, and a removable cotter pin, spring, and ball. It is located de the lower right front corner of the cabinet behind the lower front panel.



WARNING

Never remove the input power cable connector from the cabinet with power in the cable. Serious or possibly fatal shock may occur. Arcing may also damage the pins in the connector.

(2) If the front location for input power has been used, disconnect the input power cable connector.

(3) Loosen the five captive panel fastener screws.

(4) Pull the top of the lower front panel forward a few inches and then lift straight up to clear the flang on the bottom. Be careful to not damage the sealing strip on the bottom of the panel.

(5) Remove the cotter pin from the condensate trap.

NOTE

It is quite likely that the spring and ball will be forced out and several ounces of condensate will run out of the drain line. In normal operation, the condensate is not forced through the check valve until it is backed up several inches in the drain line.

Inspection/Replacement. Inspect the ball, spring, and cotter pin for damage or wear. Replace if damage or worn.

Installation. Install the condensate trap as follows:

(1) Insert the ball and spring into the seat, and then install the cotter pin.

(2) Set the bottom of the lower front panel in position so that the flange is inside the lip on the cabin base.

(3) Push the top of the panel back into position and tighten the five captive panel fastener screws.

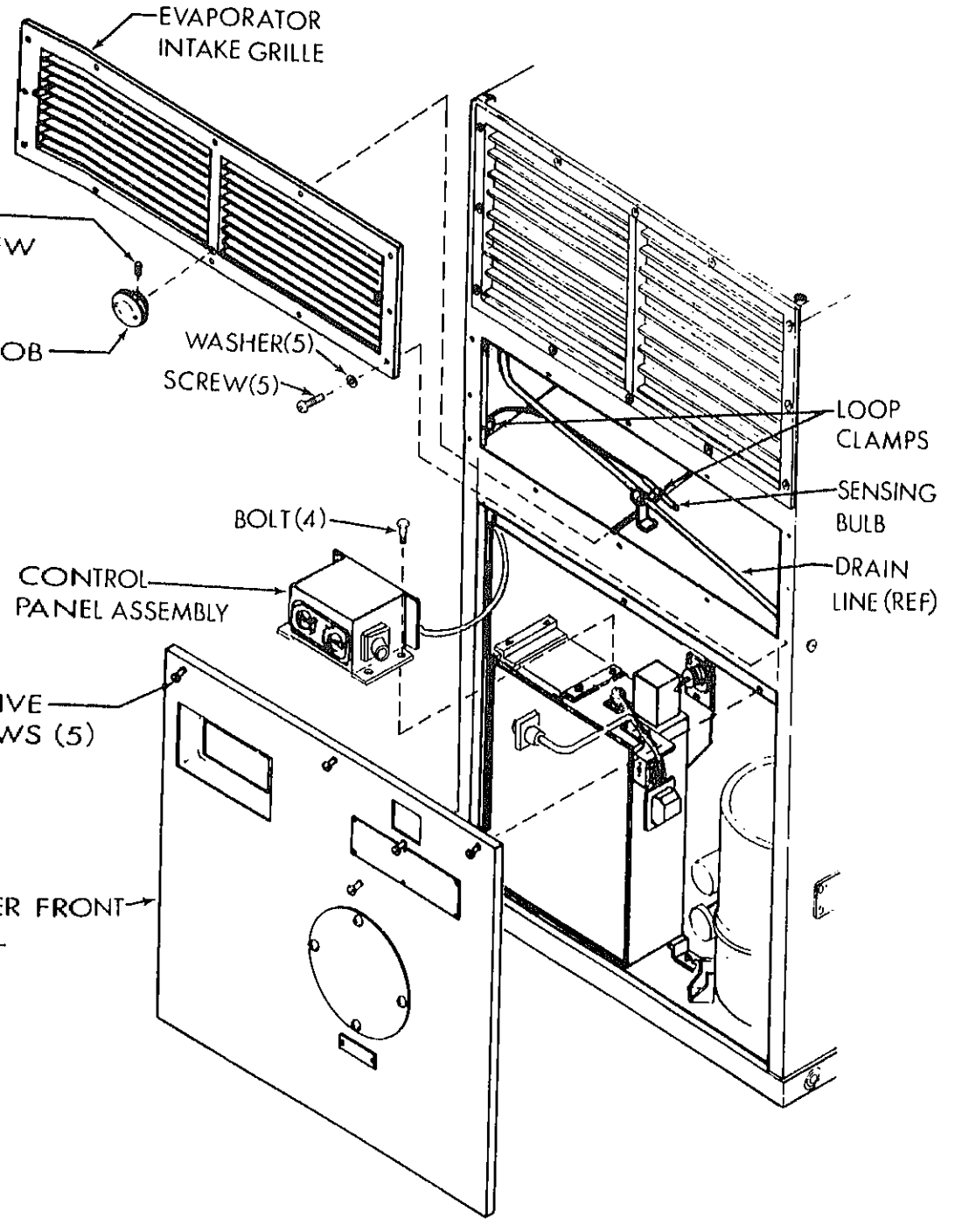
(4) Install the input power cable connector, if the front panel location is used.

(5) Connect input power at its source.

4. CONTROL PANEL ASSEMBLY See figure 4-21.

Description. The control panel is an enclosure containing the mode selector switch, the temperatu thermostat, and a wiring harness. The shafts of the switch and temperature thermostat protrude throu the front of the enclosure and attached information plate. The capillary for the temperature thermost sensing bulb exits the enclosure through a grommet in the back plate so that the bulb can be mounted e ternally. The connector for the wiring harness is mounted in one end of the enclosure.

(1) Location. At manufacture, the control panel is installed in the lower front of the cabinet behind t lower front panel, and is mounted on the top of the junction box. In this configuration, the thermost sensing bulb is attached to the condensate drain tube behind the evaporator intake grille by tv loop clamps. The air conditioner is designed so that the control panel may be removed from t cabinet and installed in a remote location. See para 4-6.b.



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enclosure by four screws with four self-locking nuts on the outside. When the back is in position o the enclosure, the control shaft protrudes through the front of the enclosure. This is an adjustabl temperature operated, single-pole, switch. The sensing bulb is connected to the thermostat throug *a capillary approximately 60 inches long. The control shaft is used to establish a reference in a tem* perature range of 40°F (5°C) to 90°F (32°C). There are three color coded screw type terminals on th thermostat. Control power is applied to the red terminal. The internal switch contact connected t the blue terminal closes when the bulb senses a temperature drop of approximately 1°F below th reference. The signal from this terminal is used to deenergize the coil in the heater relay (K1) in L HEAT or HI HEAT mode, or to energize the coil in the liquid flow solenoid valve (K3) in COOL mod The internal contact connected to the yellow terminal closes when the bulb senses a temperatu rise of approximately 1°F above the reference. This terminal is not used.

Removal. Separate procedures are given below for removal from a remote location and for removal fro the cabinet.

(1) Remove from a remote location as follows:

(a) Disconnect input power at its source.

WARNING

Never remove the wiring harness connector from the control panel with power in the wires. Serious, or possibly fatal, shock may occur. Arcing may also damage the pins in the connectors.

(b) Disconnect the connector P8 on the interconnecting wiring harness from connector J8 on th control panel.

(c) Remove mounting hardware, if used.

(2) Remove from the air conditioner cabinet as follows:

(a) Disconnect input power at its source.

WARNING

Never remove the input power cable connector from the cabinet with power in the cable. Serious, or possibly fatal, shock may occur. Arcing may also damage the pins in the connector.

(b) If the front panel location is used, disconnect the input power cable connector.

(c) Loosen the five captive panel fastener screws and remove the lower front panel.

(d) Disconnect wiring harness connector P8 from connector J8 on the control panel.

(e) Remove the four screws that attach the control panel to the top of the junction box.

(f) Loosen the setscrew and remove the front fresh air damper control knob.

(i) Remove the screw, nut, and loop clamp that holds the sensing bulb capillary to the flange on the left side panel of the casing.

(j) Carefully remove the control panel while feeding the capillary and sensing bulb between the left side panel and cabinet partition.

Disassembly. See figure 4-22. The following are complete disassembly procedures for all components in the control panel assembly.

(1) Remove the control knobs by pulling straight out.

(2) Remove the four screws and nuts that hold the back panel in the enclosure, then carefully pull the panel out of the enclosure.

(3) Remove the screws and wire terminals from the red and blue terminals on the temperature thermostat.

(4) Remove the four screws and nuts that mount the temperature thermostat to the back panel.

NOTE

If the control panel has been installed in a remote location, remove the screw, washer, and loop clamp that mount the sensing bulb to the outside of the back panel at this time.

(5) Carefully remove the grommet and capillary from the slot in the back panel, then remove the grommet from the capillary.

(6) Hold the mode selector switch inside the enclosure and remove the nut and lock washer from the outside.

(7) Pull the switch to the back of the enclosure and remove all wiring harness terminals from the switch terminals.

(8) Remove the switch from the enclosure and remove the electrical lead terminal from the switch terminal.

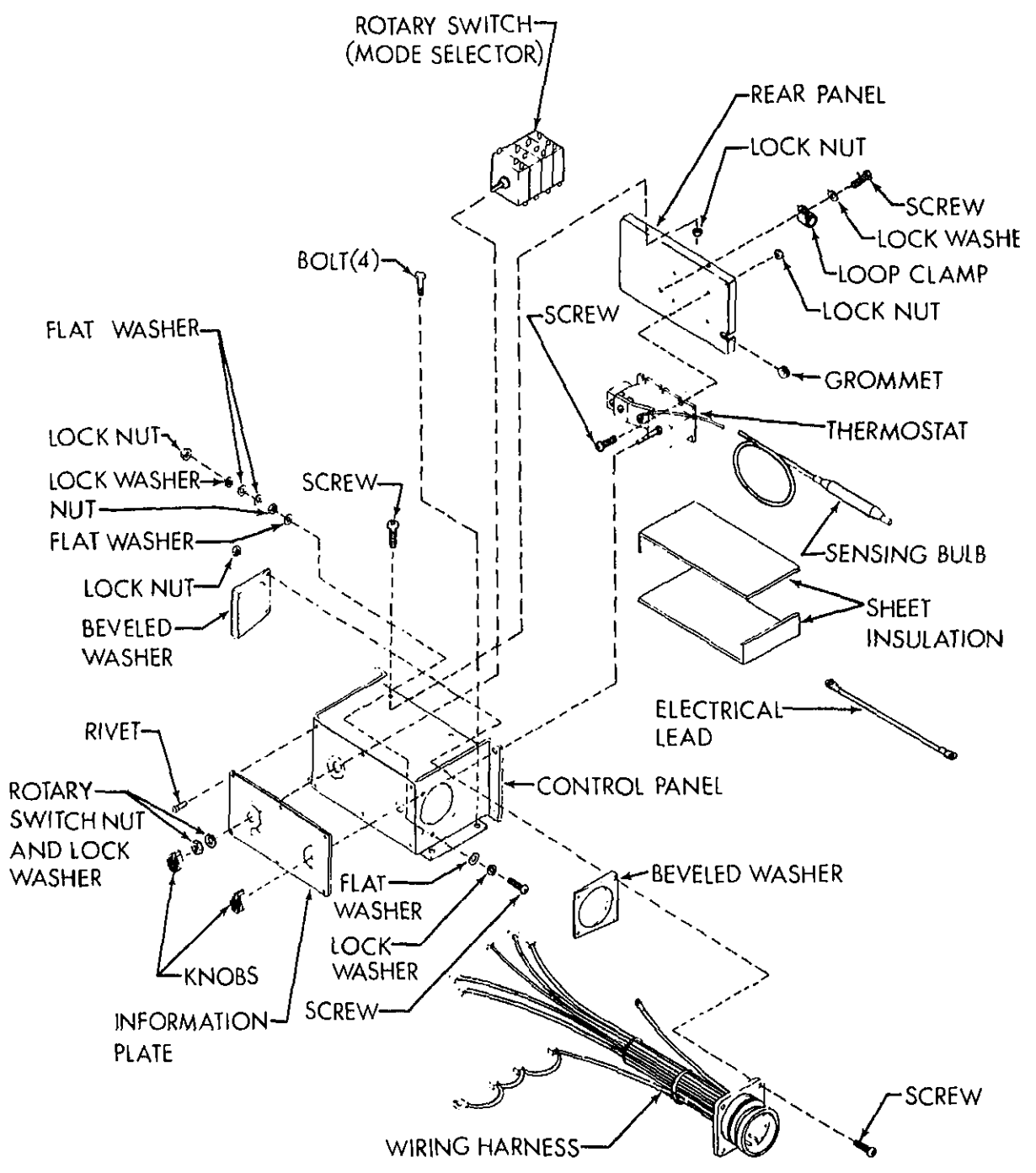
(9) Remove the nut, lock washer, two flat washers, and control panel ground terminal from the inside end of the ground screw.

(10) Remove the four screws and nuts that attach wiring harness connector J8 to the enclosure.

(11) Remove the inner and outer beveled washers and then pull the wiring harness out of the enclosure.

Mode Selector Switch Tests. Use a multimeter set on the lowest OHMS scale, or a similar continuity testing device, to test the operation of the switch. Refer to figure 4-23 for terminal arrangement and contact conditions for each switch position. Switch positions are numbered in clockwise sequence from the counterclockwise stop when facing the shaft. Replace switch if continuity is not found in accordance with the chart.

Temperature Thermostat Tests. Connect the continuity tester leads to the red and blue terminals on the temperature thermostat. Turn the thermostat control shaft fully clockwise. Continuity should not be


ROTARY SWITCH (MODE SELECTOR)
REAR PANEL
LOCK NUT
SCREW
LOCK WASHE
LOOP CLAMP
LOCK NUT
BOLT(4)
SCREW
FLAT WASHER
GROMMET
THERMOSTAT
LOCK NUT
LOCK WASHER
NUT
FLAT WASHER
SCREW
SENSING BULB
LOCK NUT
BEVELED WASHER
SHEET INSULATION
ELECTRICAL LEAD
RIVET
ROTARY SWITCH NUT AND LOCK WASHER
CONTROL PANEL
BEVELED WASHER
FLAT WASHER
LOCK WASHER
KNOBS
SCREW
INFORMATION PLATE
SCREW
WIRING HARNESS

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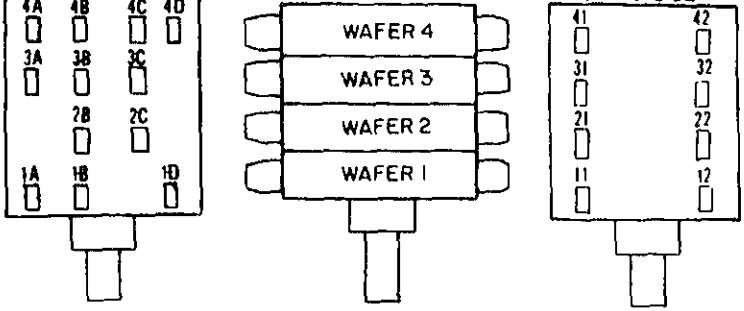

WAFER	CONTACT NO.	SWITCH POSITION 1 HI HEAT	2 LO HEAT	3 OFF	4 VENT	5 COOL
S/W1	1A&12	CLOSED	CLOSED	OPEN	OPEN	OPEN
	1B&12	OPEN	OPEN	OPEN	OPEN	CLOSED
	1D&11	OPEN	OPEN	OPEN	OPEN	CLOSED
S/W2	2B&22	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
	◀2C&21					
S/W3	◀3A&32					
	3B&32	CLOSED	OPEN	OPEN	OPEN	OPEN
	◀3D&31					
S/W4	4A&42	CLOSED	OPEN	OPEN	OPEN	OPEN
	◀4B&42					
	4C&41	CLOSED	OPEN	OPEN	OPEN	OPEN
	◀4D&41					

◀ THESE CONTACTS ARE NOT USED AND NO WIRES ARE CONNECTED TO THE TERMINALS WHEN INSTALLED

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Figure 4-23. Rotary Mode Selector Switch

test and notice that switch contact action is reversed; that is, continuity is present on clockwise r of the shaft and absent on counterclockwise rotation. Replace the thermostat if the switch cont not operate properly.

NOTE

Since the effective range of the temperature thermostat is in the range of 40°F (5°C) and 90°F (32°C), the operation of the switch cannot be tested if the air temperature surrounding the sensing bulb is below or above this range.

f. Wiring Harness Tests. Check continuity between each pin in the connector and the terminal on tached wire. Continuity should be indicated. Check continuity between each pin and the connecto Continuity should not be indicated. Replace wires, terminals or the connector, as necessary.

g. Assembly. Refer to figure 4-22 and assemble the control panel as follows:

(1) Insert the wire ends of wiring harness J8 through the hole in the end of the enclosure.

WIRE NO.	SWITCH TERMINAL	WIRE NO.	SWITCH TERMINAL
X3M14	42	X15A14	4A
X4K14	41	X14A14	4C
X2M14	32	X16A14	3A
X3C14	22	V6A16	2B
V3D16	11	V16A16	1A
*V14A16	12	V15A16	1B
		V7A16	1D

rminal on the separate electrical lead.

(5) Insert the mode selector switch in the enclosure and position so that the shaft protrudes through th front. Hold the switch on the inside and install the lock washer and nut on the outside.

(6) Install the grommet on the capillary to the sensing bulb, then carefully insert the grommet an capillary in the slot in the back panel.

NOTE

If the control panel is to be installed in a remote location, mount the sensing bulb to the back panel by installing the loop clamp, screw, and washer at this time.

(7) Position the temperature thermostat on the back panel, and install the four mounting screws an nuts.

(8) Install the terminal on wire V3E16 and the attaching screw on the red terminal on the temperatur thermostat.

(9) Install the terminal on electrical lead wire V14A16 and the attaching screw on the blue terminal o the temperature thermostat.

(10) Position the back panel in the enclosure, and install the four mounting screws and nuts.

(11) Install the control knobs.

. Installation. Separate procedures are given below for installation in a remote location and for installatio in the cabinet.

(1) Install in a remote location as follows:

(a) Install mounting hardware, if used.

(b) Connect the connector on the interconnecting wiring harness to the cabinet to connector J8 o the control panel.

(c) Connect input power at its source.

(2) Install in the cabinet as follows:

(c) Install the loop clamp, screw and nut that hold the capillary to the flange on the left side par the casing.

(d) Install the four screws that attach the control panel to the top of the junction box.

(e) Connect wiring harness connector P8 to connector J8 on the control panel.

(f) Install the evaporator intake grille and the 12 mounting screws and washers.

(g) Install the front fresh air damper control knob, aline the setscrew with the flat on the shaft tighten the setscrew.

(h) Install the lower front panel and tighten the five captive panel fastener screws.

(i) Connect the input power cable connector, if the front panel location is used.

(j) Connect input power at its source.

-25. JUNCTION BOX See figure 4-24.

a. Description. The junction box is an enclosure that contains the circuit breaker, fuses, motor relays, h relay, time delay relay, terminal boards, and interconnecting wiring harnesses and electrical leads control panel and the step-down transformer for the control power circuits are mounted to the top c junction box, and the dc rectifier bridge and radio frequency interference (RFI) filter assembly is mou to the back. The junction box is located in the lower left front of the cabinet directly behind the lower panel. An information plate containing the air conditioner wiring diagram is attached to the face c front cover plate of the junction box; an information plate containing the refrigeration system schematic is attached to the inside of the same cover plate.

b. Removal. Remove the junction box as follows:

WARNING

Disconnect input power from the air conditioner before performing maintenance on any part of the electrical system. The voltages used can be lethal.

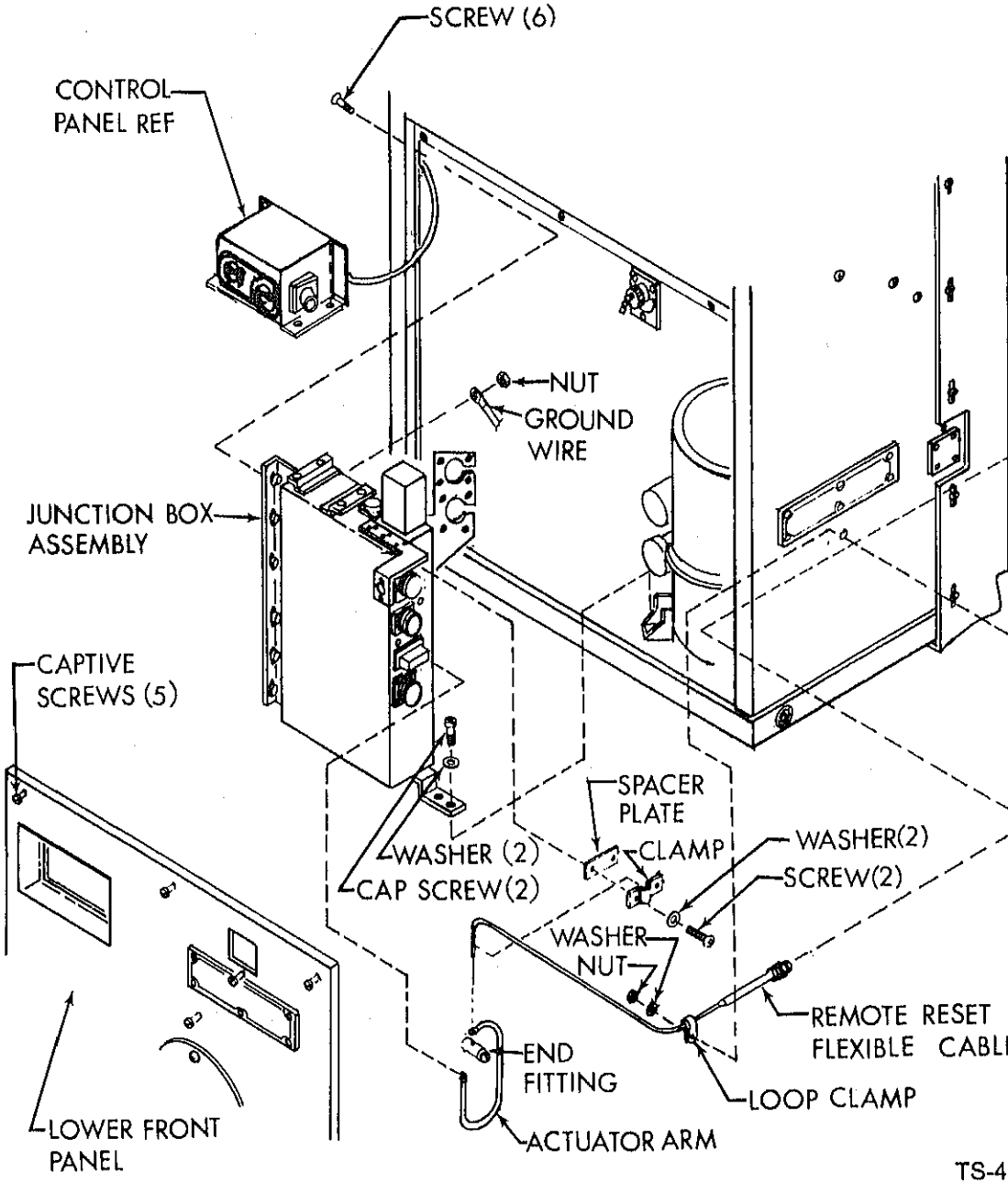
(1) Disconnect input power at its source.

(2) Disconnect input power cable connector, if the front panel location is used.

(3) Loosen the five captive panel fastener screws and remove the lower front panel.

NOTE

If the control panel is installed in the cabinet, the junction box can be removed from the cabinet without fully removing the control panel. However, this practice is not recommended due to the danger of possible damage to the capillary to the sensing bulb. If the control panel is remotely located and the block off panel has been installed on the top of the junction box, it may remain attached when the junction box is removed. If one of the openings in the block off panel has


SCREW (6)
CONTROL PANEL REF
NUT
GROUND WIRE
JUNCTION BOX ASSEMBLY
CAPTIVE SCREWS (5)
SPACER PLATE
WASHER (2)
CAP SCREW(2)
CLAMP
WASHER(2)
SCREW(2)
WASHER
NUT
REMOTE RESET FLEXIBLE CABL
END FITTING
LOOP CLAMP
ACTUATOR ARM
LOWER FRONT PANEL

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(b) Remove the four bolts that attach the control panel to the top of the junction box.

(c) Loosen the setscrew and remove the front fresh air damper control knob.

(d) Remove the 12 mounting screws and washers, and remove the evaporator intake grille.

(e) Loosen the screw and nut in the loop clamps that hold the temperature sensing bulb to th condensate drain tube, and slip the bulb out of the clamp.

(f) Remove the screw, nut, and loop clamp that hold the capillary to the flange on the left side pane of the casing.

(g) Carefully remove the control panel while feeding the capillary and sensing bulb between the le side panel and the cabinet partition.

5) Disconnect wiring harness connector P13 from connector J13 on the top of the junction box.

6) Remove the eight nuts, lock washers, flat washers, and screws that attach wiring harnes connectors J17 and J19 to the bracket on the top right hand side of the junction box, and remove th connectors.

7) Disconnect wiring harness connectors P4, P10, and P14 from connectors J4, J10, and J14 on th right hand side of the junction box.

8) Loosen the lock screw and remove the end fitting from the circuit breaker remote reset flexible cabl then loosen the two screws in the clamp and spacer plate, and pull the flexible cable out of th actuator arm.

9) Remove the two mounting screws and washers that attach the bracket at the bottom right hand sid of the junction box to the air condltioner base.

10) Remove the nut and ground terminal from the grounding screw on the upper left hand side of th back of the junction box.

11) Remove the six screws that attach the mounting bracket on the left hand side of the junction box the left side panel of the casing.

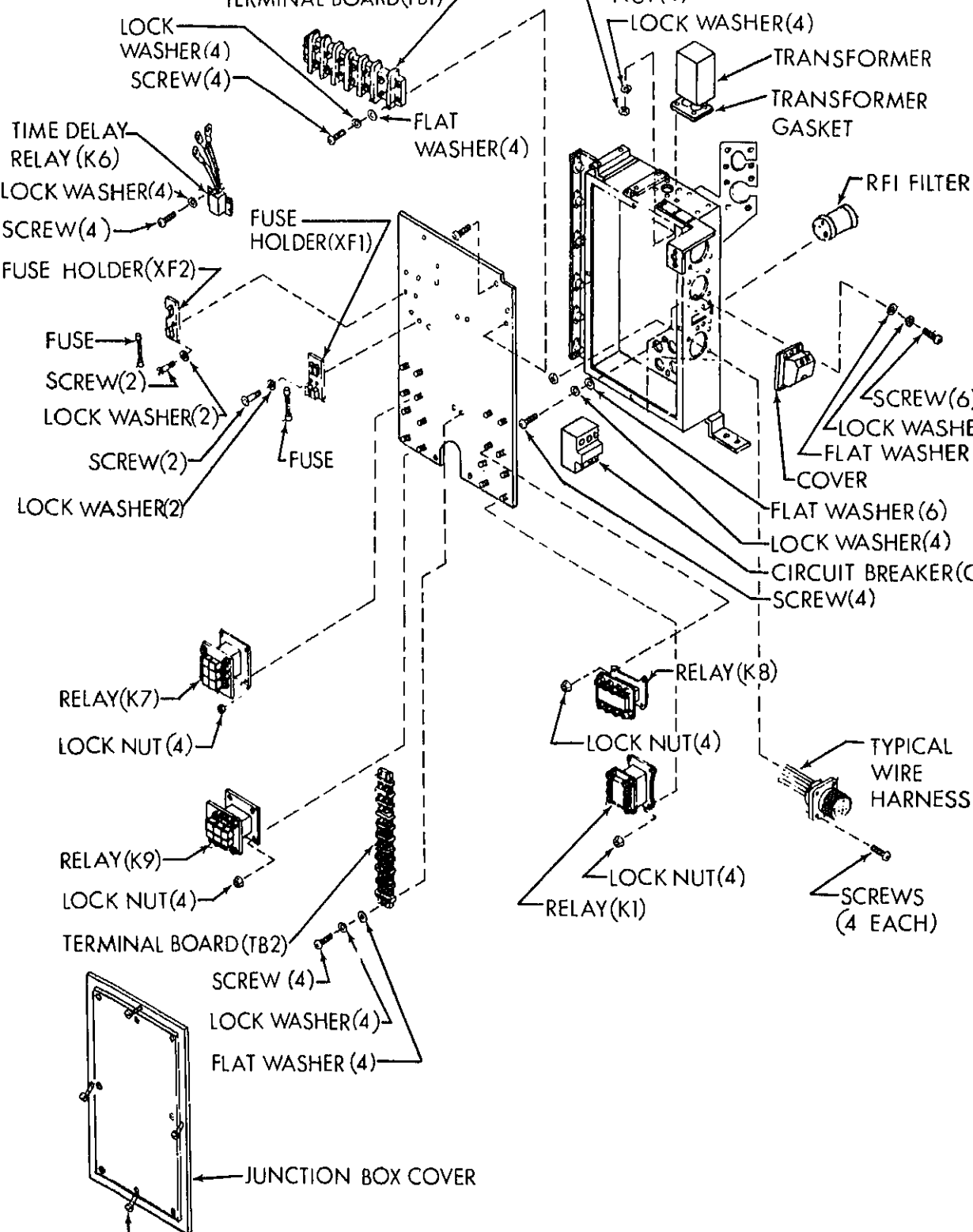
12) Remove the entire junction box assembly from the cabinet.

Disassembly. See figure 4-25. It should seldom, if ever, be necessary to completely disassemble all the i ernal components within the junction box at any one time. Disassemble only as necessary to test eplace specific components, in accordance with the following:

1) Loosen the four captive panel fastener screws and remove the front cover from the junction box

NOTE

Subparagraphs (2) through (9) below, each contain a complete procedure for the removal of a single major component. If more than one major component is removed at the same time, some of the steps in the individual procedure may have already been accomplished in the previous removal of another component.


LOCK WASHER(4)
SCREW(4)
FLAT WASHER(4)
LOCK WASHER(4)
TRANSFORMER
TRANSFORMER GASKET
TIME DELAY RELAY (K6)
LOCK WASHER(4)
SCREW(4)
FUSE HOLDER(XF1)
FUSE HOLDER(XF2)
RFI FILTER
FUSE
SCREW(2)
LOCK WASHER(2)
SCREW(2)
LOCK WASHER(2)
FUSE
SCREW(6)
LOCK WASHE
FLAT WASHER
COVER
FLAT WASHER(6)
LOCK WASHER(4)
CIRCUIT BREAKER(C
SCREW(4)
RELAY(K7)
LOCK NUT(4)
RELAY(K8)
LOCK NUT(4)
TYPICAL WIRE HARNESS
RELAY(K9)
LOCK NUT(4)
LOCK NUT(4)
RELAY(K1)
SCREWS (4 EACH)
TERMINAL BOARD(TB2)
SCREW (4)
LOCK WASHER(4)
FLAT WASHER (4)
JUNCTION BOX COVER

Remove the RFI filter and dc rectifier assembly as follows:

(a) Remove the nuts, washers, and wire terminals from the X1 and X2 terminal studs on the transformer.

(b) Remove the screw from the right side of terminal 1 on terminal board TB2.

(c) Remove the screw from terminal 1 on fuse holder XF2.

(d) Remove the four screws, lock washers, and flat washers that attach the RFI filter and dc rectifier assembly to the back of the junction box.

(e) Carefully pull the four lead wires disconnected in step (d) above down to the four holes in the back of the junction box so that they can be pulled out with the assembly.

Remove circuit breaker as follows:

(a) Remove the wire terminals from the six primary terminals on the circuit breaker.

(b) Unsolder the wires from the two auxiliary switch contacts on the circuit breaker.

(c) Remove the six screws, lock washers, and flat washers that attach the reset bar cover to the circuit breaker, and slide the cover down the remote reset actuator arm.

(d) Remove the shaft that holds the three circuit breaker reset switches together, then remove the actuator arm and switch cover.

(e) Remove the circuit breaker from inside the junction box.

Remove motor control relays as follows:

NOTE

he three motor control relays (K7, K8 and K9) for the evaporator, condenser, and compressor iotors are identical.

(a) Loosen the two captive screws in the terminal covers on each side of the relay, and remove the covers.

(b) Remove the nuts, washers, and wire terminals from the six primary terminal studs on the relay.

(c) Remove the nuts, washers, and wire terminals from the two coil terminal studs on the relay.

(d) Remove the nuts and washers from the four studs that attach the relay to the junction box panel.

(e) Remove the relay.

Remove heater relay as follows:

(a) Loosen the two captive screws in the terminal cover on each side of the relay, and remove the covers.

(b) Remove the nuts, washers, and wire terminals from the six primary terminal studs on the relay.

(7) Remove time delay relay as follows:

(a) Remove the screw and the terminal on wire V5N16 from the left side of terminal 3 on terminal board TB2.

(b) Remove the nut, washer, and the terminal on wire V13A16 from coil terminal stud X2 on compressor motor relay (K9).

(c) Remove the nut, washer, and the terminal on wire V11D16 from coil terminal stud X2 on condenser motor relay (K7).

(d) Remove the four screws and lock washers that attach the time delay relay to the junction box panel.

(e) Remove the time delay relay.

(8) Remove fuses and fuse holders as follows:

(a) Pull fuses out of the spring clip fuse holders with the fingers or a fuse puller.

(b) Remove the screws and wire terminals from the holder at each end of the fuse clip.

(c) Remove the two screws and washers that attach the holder to the junction box panel and remove the holder.

(9) Remove wiring harnesses as follows:

(a) Disconnect terminals on all wires in the harness from the terminals on other components.

(b) Remove the four screws and nuts that attach the connector to the junction box.

(c) Carefully work the wires out through the opening in the junction box, being careful to not damage insulation or terminal lugs.

Component Testing. Test components of the junction box as follows:

NOTE

The separate procedures below for testing individual components are written with the assumption that the components have been removed from the junction box. Most of these tests can be performed with the wires disconnected but with the components still installed in the junction box, so that actual removal is only necessary when replacement is required.

(1) Test the control power transformer as follows:

(a) Connect the leads of a continuity tester or a multimeter set on the lowest OHMS scale to terminal studs H1 and H2. If the secondary winding is open, replace the transformer.

(b) Connect the leads of a continuity tester or a multimeter set on the lowest OHMS scale to terminal studs X1 and X2. If the secondary winding is open, replace the transformer.

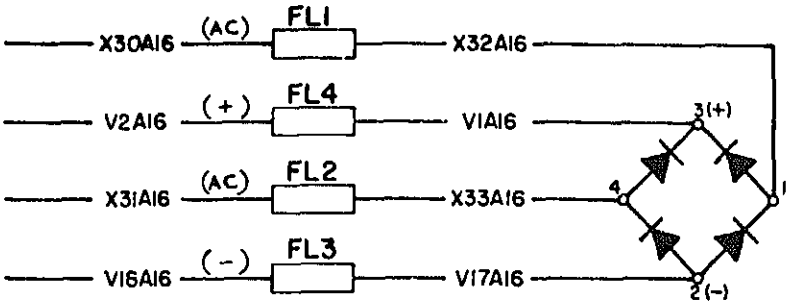
(c) Connect one lead of an insulation tester, a "megger," or a multimeter set on high OHMS scale to either terminal stud H1 or H2 and the other lead to the transformer case. If resistance is less than

0.5 megohm, replace the transformer.

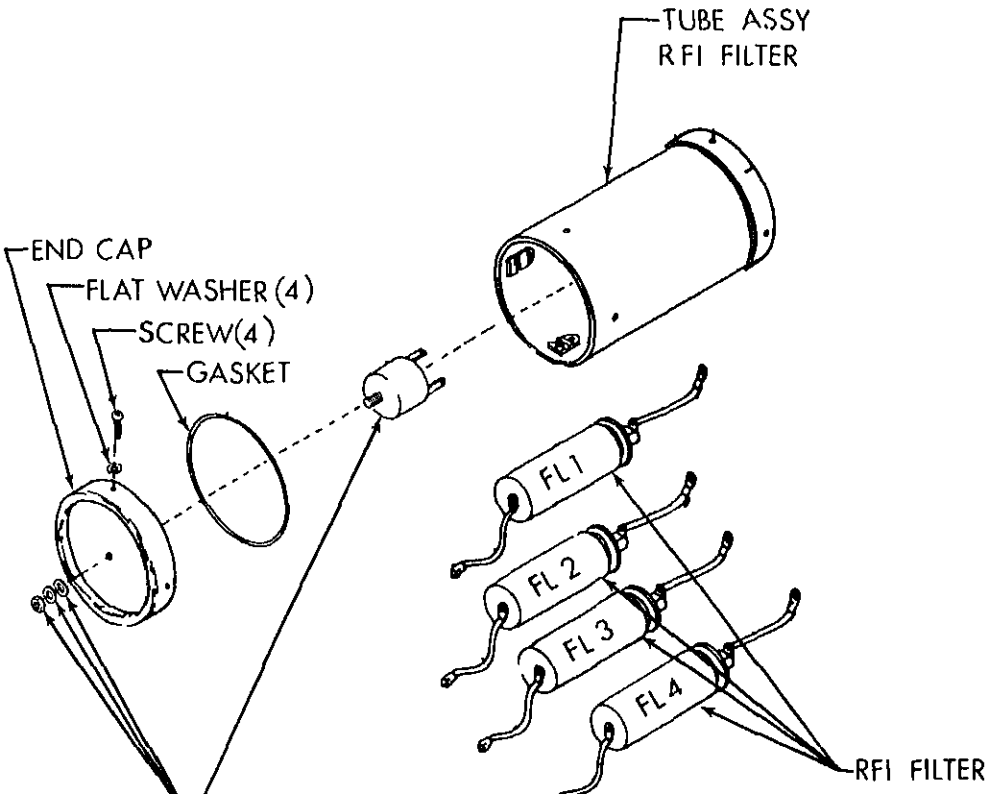
(e) Connect one lead of an insulation tester, a "megger," or a multimeter set on high OHMS scale to either terminal stud H1 or H2 and the other lead to either terminal stud X1 or X2. If resistance is less than 0.5 megohm, replace the transformer.

Test the RFI filter and dc rectifier assembly (fig. 4-26) as follows:

(a) Disassemble by removing the four screws and washers that attach the cap to the tube, pull the cap off the tube, and remove the four wire terminals from the terminals on the rectifier bridge. Further disassembly is not necessary for testing.



WIRING DIAGRAM



(c) Use a continuity tester or a multimeter set on the lowest OHMS scale to test between each filter lead and the case. If continuity is found between any lead and the case, replace the affected filter.

(d) Use a continuity tester or a multimeter set on the lowest OHMS scale to test for continuity between each of the four rectifier terminals and the cap. If continuity is found between any rectifier terminal and the cap, replace the rectifier.

(e) Use a multimeter to test resistance across the rectifier bridge in accordance with the following table. If resistance is different from that indicated in the table, replace the rectifier.

Table 4-3
Rectifier Tests

Meter Lead Neg	Pos	Resistance
Term. 1	Term. 2	1 ohm or less
Term. 1	Term. 3	1000 ohms or more
Term. 2	Term. 1	1000 ohms or more
Term. 2	Term. 4	1000 ohms or more
Term. 4	Term. 2	1 ohm or less
Term. 4	Term. 3	1000 ohms or more
Term. 3	Term. 1	1 ohm or less
Term. 3	Term. 4	1 ohm or less
Term. 1	Term. 4	1000 ohms or more
Term. 4	Term. 1	1000 ohms or more
Term. 2	Term. 3	1000 ohms or more
Term. 3	Term. 2	1000 ohms or more

NOTE

A diode bridge will sometimes act differently under a power test than resistance tests indicate. To perform a power test, apply 28 volts ac across terminals 1 and 4 and use a dc voltmeter with the negative lead on terminal 2 and the positive lead on terminal 3 to test output voltage. The meter should read 24 ± 5 volts. If output voltage is not within limits, replace the rectifier.

(f) Reassemble by attaching the four filter leads to the correct rectifier terminals, slip the cap on the tube, and install the four screws and washers.

(3) Test circuit breaker as follows:

(a) Set circuit breaker reset bar in the OFF position.

(b) Use a continuity tester or a multimeter set on the lowest OHMS scale to check continuity between terminals A1 and A2, B1 and B2, C1 and C2, and auxiliary switch terminals C and NO. All the contacts should be open. If there is continuity on any check, replace the circuit breaker.

(c) Press the reset bar toward the OFF stop, then place it in the ON position.

(d) Use a continuity tester or multimeter set on the lowest OHMS scale and repeat continuity check between terminals A1 and A2, B1 and B2, C1 and C2, and auxiliary switch terminals C and NO. A

continuity between A, B or C terminals, replace the relay.

(b) Check continuity between coil terminals X1 and X2. If there is no continuity, the coil is open; replace the relay.

(c) Apply 24 volts dc across terminals X1 and X2 and repeat continuity checks between terminals A1 and A2, B1 and B2 and C1 and C2. All three contact should be closed. If there is no continuity between A, B or C terminals, replace the relay.

(d) Remove the 24 volts dc from coil terminals X1 and X2.

) Test time delay relay as follows:

(a) Use a continuity tester or a multimeter set on the lowest OHMS scale to check continuity between the terminals on wires V11D16 and V5N16. If there is no continuity, replace the time delay relay.

(b) Check for continuity between the terminals on wires V11D16 and V13A16. If there is continuity, replace the time delay relay.

(c) Apply 24 volts dc to the terminals on wires V11D16 and V5N16 and check for continuity between the terminals on wires V11D16 and V13A16. There should be no continuity initially, then, after a delay of approximately 30 seconds the relay contact should close and there will be continuity. If the contact does not close in approximately 30 seconds, replace the time delay relay.

(d) Remove the 24 volts dc from the terminals on wires V11D16 and V5N16.

) Test fuses from end to end with a continuity tester or a multimeter set on the lowest OHMS scale. Replace open fuses.

NOTE

Blown fuses cannot always be detected by visual examination.

') Test wiring harnesses as follows:

(a) Remove the attaching hardware and remove the terminal on the end of each wire in the affected wiring harness from the terminal to which it is connected.

NOTE

Wiring harness can be tested without removing them from the junction box. To test a harness in its installed location, disconnect the terminals on the ends of all wires and ensure that the terminals are not touching any metal object, then proceed with continuity tests.

(b) Remove the attaching hardware from the wiring harness connector and carefully pull the wiring harness out of the junction box.

(c) Use a continuity tester or a multimeter set on the lowest OHMS scale to check continuity between each pin in the wiring harness connector and the terminal on the end of the wire connected to that pin.

(1) If continuity is not found between any pin and the terminal on the connected wire, or if continuity is found between any pin and the case or any other pin, thoroughly inspect the wires and connector for damage and repair as necessary.

Wiring harness repair. Repair wiring harnesses in accordance with procedures in paragraph 4-26.d.

Assembly. Assembly of the junction box will normally only be required to the extent to which it was disassembled for repair. Assemble removed components in accordance with wiring diagram figure 4-7 and the appropriate procedures which follow:

1) Install wiring harnesses as follows:

(a) Carefully insert the wires through the opening in the junction box, being careful not to damage terminal lugs or insulation.

(b) Position the connector, aline the mounting holes, and install the four screws and nuts that attach the connector to the junction box.

(c) Connect the terminals on all wires in the harness to the proper terminals on components.

2) Install fuse holders and fuses as follows:

(a) Position the fuse holder on the junction box panel, align the mounting holes, and install the two screws and washers that attach it to the panel.

(b) Install the proper wire terminals and screws to the terminals at each end of the fuse clip.

(c) Snap the fuse(s) into the spring clip(s).

3) Install the time delay relay as follows:

(a) Position the time delay relay on the junction box panel, align the mounting, holes and install the four screws and washers that attach it to the panel.

(b) Install the terminal on wire V11D16 on coil terminal stud X2 on condenser motor relay K7, and install the attaching washer and nut.

(c) Install the terminal on wire V13A16 on coil terminal stud X2 on compressor motor relay K9, and install the attaching washer and nut.

(d) Install the terminal on wire V5N16 and the attaching screw to the left side of terminal 3 on terminal board TB2.

4) Install heater relay as follows:

(a) Position the relay on the four studs that mount it to the junction box panel, and install the four attaching washers and screws.

(b) Install the proper wire terminals on the two coil terminal studs on the relay, and install the attaching washers and nuts.

(c) Install the proper wire terminals on the six primary terminal studs on the relay, and install the attaching washers and nuts.

(b) Install the proper wire terminals on the two coil terminal studs on the relay, and install the attaching washers and nuts.

(c) Install the proper wire terminals on the six primary terminal studs on the relay, and install the attaching washers and nuts.

(d) Position the terminal covers on each side of the relay and tighten the two captive screws in each cover.

Install the circuit breaker as follows:

(a) Position the circuit breaker on the inside of the junction box so that the switches are protruding through the opening.

(b) Install the shaft that holds the three circuit breaker reset switches together, being sure it also goes through the hole in the end of the actuator arm of the remote reset mechanism.

(c) Position the cover over the protruding reset switches, align the mounting holes, and install the six flat washers, lock washers, and screws.

(d) Solder the proper wires to the two auxilliary switch terminals on the circuit breaker.

(e) Install the proper wire terminals on the six primary terminals on the circuit breaker.

Install the RFI filter and dc rectifier assembly as follows:

(a) Carefully insert the four lead wires through the proper holes in the back of the junction box, position the assembly on the back of the box, align the mounting holes, and install the four flat washers, lock washers, and screws.

(b) Install the terminal on wire V2A16 and the attaching screw to terminal 1 on fuse holder XF2.

(c) Install the terminal on wire X30A16 and the attaching washer and nut on terminal stud X2 of the transformer.

(d) Install the terminal on wire X31A16 and the attaching washer and nut on terminal stud X1 on the transformer.

(e) Install the terminal on wire V18A16 and the attaching screw to the right side of terminal 1 on terminal board TB2.

Install the control power transformer as follows:

(a) Position the transformer on the top of the junction box with the mounting studs protruding through the top plate.

(b) Install the four washers and nuts on the mounting studs.

(c) Install the proper wire terminal and attaching washer and nut on each of the four terminal studs.

Position the front cover on the junction box and tighten the four captive panel fastening screws.

ing holes in the left side panel of the casing, and install the six mounting screws.

(2) Align the holes in the bracket at the bottom right side of the junction box with the mounting hole the base, and install the two washers and screws.

(3) Insert the flexible cable from the circuit breaker remote reset assembly into the actuator arm tached to the circuit breaker reset bar, install the end fitting on the cable, and tighten the lock sc Then properly position the flexible cable assembly and tighten the two screws in the clamp spacer plate.

(4) Install the terminal on the ground lead on the stud on the upper left hand side of the back o junction box, and install the lock nut.

(5) Attach wiring harness connectors P14, P10 and P4 to connectors J14, J10 and J4 on the right h side of the junction box, respectively.

(6) Attach wiring harness connector P13 to connector J13 on the top of the junction box.

(7) Install wiring harness connectors J17 and J19 on their bracket on the top right hand side o junction box and install the eight mounting screws, flat washers, lock washers, and nuts.

NOTE

If the control panel is remotely located, the block-off panel should still be attached to the top of the junction box. If this is the case, and one of the openings in the block off panel has been used to attach the wiring harness to the remote location, install wiring harness connector P8 and the four mounting screws and nuts in the block off plate at this time, and skip the procedures in step (9) below.

(8) Install control panel assembly as follows:

(a) Carefully feed the sensing bulb and capillary between the left side panel of the casing an cabinet partition while positioning the control panel on the top of the junction box.

(b) Slip the sensing bulb into the loop clamp that attaches it to the condensate drain line and tig the screw and nut in the clamp.

(c) Install the loop clamp and screw that holds the capillary to the flange on the left side panel c casing.

(d) Install the four bolts that attach the control panel to the top of the junction box.

(e) Connect wiring harness connector P8 to connector J8 on the end of the control panel.

(f) Install the evaporator intake grille and the 12 mounting screws and washers.

(g) Install the front fresh air damper control knob, align the setscrew with the flat on the shaft tighten the setscrew.

(9) Install the lower front panel and tighten the five captive panel fastening screws.

(10) Connect the input power cable connector, if the front panel location is used.

Description. There are three major wiring harnesses in the lower section of the cabinet; two in the uppe section; and three that originate in the lower section, pass through the separating partition, and termi nate in the upper section. All wires in all harnesses terminate at both ends at a pin in a wiring connecto except for the six power wires in the heater harness; each of these six wires have a separate terminal at ached at the heater end. In addition, a single wire ground lead is connected between studs on the junc ion box and the back panel in the lower section, and three single wire electrical leads are used to inter connect the heater element in the upper section. Three leads from the heater overheat thermostat ar also connected to the heater element in the upper section. The wire list provided in Table 4-4 identifies al wires, connectors, and terminals in the entire air conditioner, including those items that are installe nternally within the junction box and the control panel.

Removal. It is recommended that wiring harnesses be removed from the cabinet before any repair actio s performed. Separate removal procedures are given below for each of the eight major wiring harnesses

WARNING

Disconnect input power from the air conditioner before performing any maintenance or dis-assembly of any electrical components. The voltages used can be lethal.

1) Remove P7-P3-heater terminal wiring harness as follows:

   (a) Refer to paragraph 4-15.b. and figure 4-12 and remove the top panel from the cabinet.

   (b) Disconnect connector P7 from connector J7.

   (c) Disconnect connector P3 from connector J3.

   (d) Remove the nuts, lock washers, flat washers, and wire terminals from the six heater elemen terminal studs.

   (e) Remove the screw and loop clamp that hold the heater lead wires, and remove the wiring harnes from the cabinet.

2) Remove P12-P6-J7 wiring harness as follows:

   (a) Refer to paragraph 4-15.b. and figure 4-12 and remove the top panel from the cabinet.

   (b) Disconnect connector P7 from connector J7.

   (c) Loosen the setscrew and remove the front fresh air damper control knob.

   (d) Remove the 12 mounting screws and washers, and remove the evaporator intake grille.

   (e) Remove the five screws and lock washers from the filter retaining angle bracket, and remove th bracket and the conditioned air filter element.

   (f) Disconnect connector P6 from connector J6.

   (g) Disconnect connector P12 from connector J12.

   (h) Remove the four nuts and screws that mount connector J7, and remove the wiring harness fro

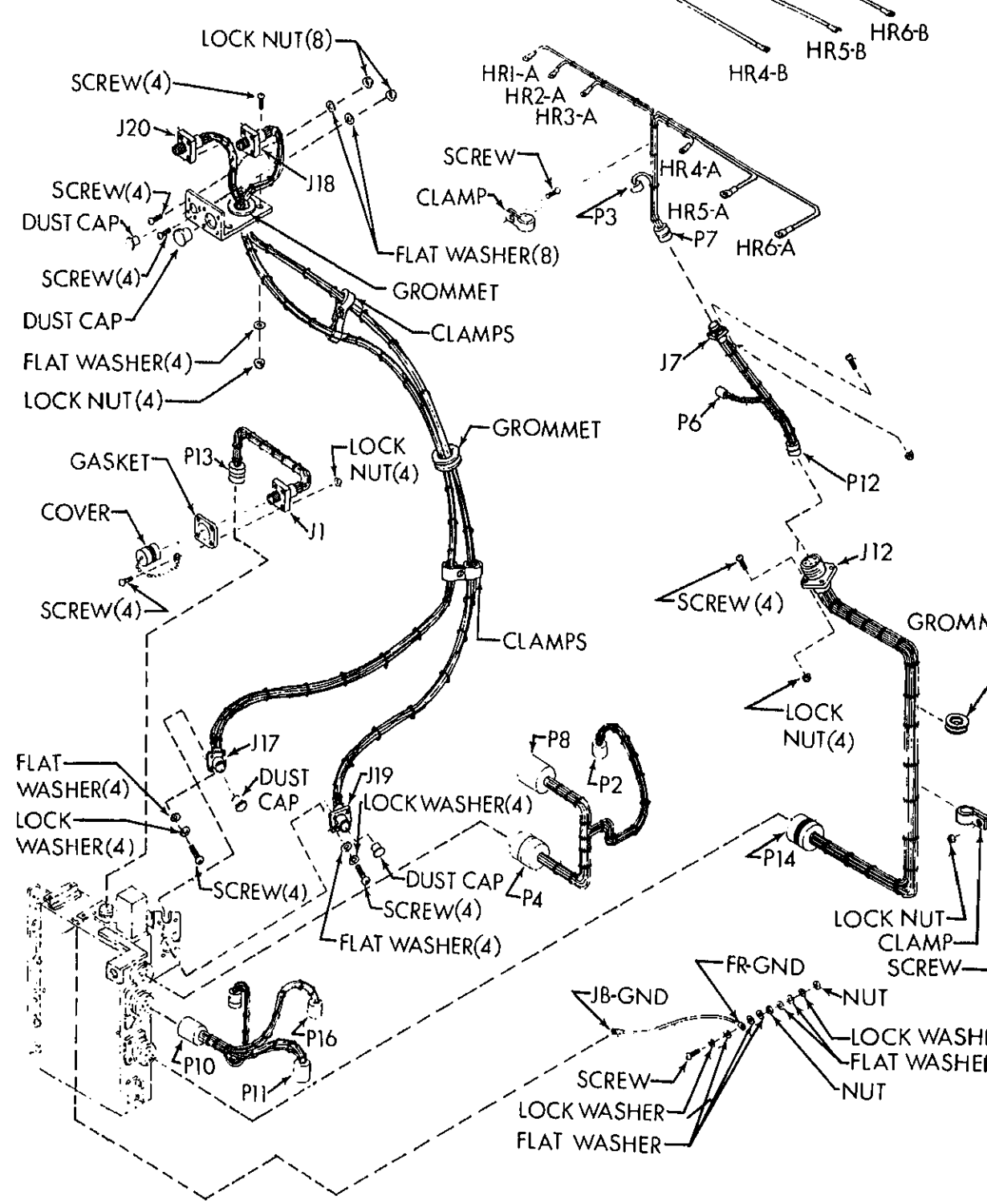


Figure 4-27. Wiring Harnesses

(b) Loosen the five captive panel fastener screws and remove the lower front panel.

(c) Loosen the setscrew and remove the front fresh air damper control knob.

(d) Remove the 12 mounting screws and washers, and remove the evaporator intake grille.

(e) Remove the 12 mounting screws, flat washers, and lock washers, and remove the condenser intake screen.

(f) Remove the eight nuts, washers, and screws that attach connector J18 and J20 to their mounting bracket.

(g) Remove the four nuts, washers, and screws that attach the mounting bracket to the cabinet partition. (This operation will require two persons; one to remove the nuts and washers through the condenser intake opening, and the other to remove the screws through the evaporator intake opening.)

(h) Remove the grommet from the hole in the base of the mounting bracket, slip the harnesses out of the slot in the back of the bracket base, and remove the bracket.

(i) Unsolder the wires from all pins in connectors J18 and J20, and remove the connectors.

(j) Remove the nut, washer, two loop clamps, and screw that attach the harnesses to the right side panel of the casing above the condenser coil. This operation will require two persons; one to remove the nut, washer, and loop clamps through the condenser intake opening, and the other to remove the screw from the outside of the casing.)

(k) Pull the wires of both harnesses down through the square hole in the cabinet partition.

(l) Remove the nut, washer, two loop clamps, and screw that attach the harnesses to the right side panel of the casing below the condenser coil. (This operation will require two persons; one to remove the nut, washer, and loop clamps through the lower front panel opening, and the other to remove the screw from the outside of the casing.)

(m)Remove the eight nuts, washers, and screws that attach connectors J17 and J19 to their mounting bracket and slip the harnesses out of the slots in the bracket.

(n) Carefully pull the J17-J18 and J19-J20 harness wires down through the grommet in the condenser coil frame and remove the harnesses from the cabinet.

Remove P14-J12 wiring harness as follows:

(a) Disconnect the input power cable connector, if the front panel location is used.

(b) Loosen the five captive panel fastening screws and remove the lower front panel.

(c) Loosen the setscrew and remove the front fresh air damper control knob.

(d) Remove the 12 mounting screws and washers, and remove the evaporator intake grille.

(e) Remove the five screws and washers from the filter retaining angle bracket, and remove the bracket and the conditioned air filter element.

the other to remove the screws through the evaporator intake opening.)

(i) Unsolder the wires from all pins in connector J12, and remove the connector.

(j) Disconnect connector P14 from connector J14.

(k) Remove the nut, screw and loop clamp that attach the wiring harness to the lip on the of the right side panel of the casing.

(l) Carefully pull the harness wires down through the grommet in the condenser coil remove the harness from the cabinet.

(5) Remove P13-J1 wiring harness as follows:

(a) Disconnect the input power cable connector from connector J1.

(b) Loosen the five captive panel fastener screws and remove the lower front panel.

(c) Disconnect connector P13 from connector J13.

(d) Remove the four nuts and screws that attach connector J1 to the power input locat

(e) Remove the wiring harness from the cabinet.

(6) Remove P4-P8-P2 wiring harness as follows:

(a) Disconnect the input power cable connector, if the front panel location is used.

(b) Loosen the five captive panel fastener screws and remove the lower front panel.

(c) Disconnect connector P4 from connector J4.

(d) Disconnect connector P8 from connector J8.

(e) Disconnect connector P3 from connector J3.

(f) Remove the wiring harness from the cabinet.

(7) Remove P10-P5-P11-P16 wiring harness as follows:

(a) Disconnect the input power cable connector, if the front panel location is used.

(b) Loosen the five captive panel fastener screws and remove the lower front panel.

(c) Disconnect connector P10 from connector J10.

(d) Disconnect connector P5 from connector J5.

(e) Disconnect connector P11 from connector J11.

(f) Disconnect connector P16 from connector J16.

(g) Remove the wiring harness from the cabinet.

) Test each wire by checking for continuity from end-to-end.

) Test for grounding short circuits by checking for continuity between each pin and the connector case.

) Test for wire-to-wire short circuits by checking for continuity between each pin and each other pin in the connector.

epair. Preferred repair methods consist of replacing wires, terminals, connectors, etc., rather than splic-g wires, bending ends to form terminals, and other make-shift procedures, although the latter may be ppropriate for emergency field repairs. Determine the proper size and length of wire, or the terminal, or nnector to be used for replacement by referring to Table 4-4. "Wire List", and to the wiring diagram g. 4-7).

) Soldering Connections. Wire connections must be made mechanically sound before they are soldered; solder alone does not provide sufficient strength to prevent breakage. Joining surfaces of connections to be soldered must be clean and bright. If a separate flux is used, it should conform to Specification MIL-F-4995, Type I, rosin-alcohol flux, and should be brushed onto the joint before soldering. If a flux-core solder is used, it should always be rosin-core electrical solder. If an uncored solder is used, it should be a lead-tin solder conforming to Specification QQ-S-571. Wires should always be heated to the point at which the solder will melt completely and flow into all parts of the joint. Excessive build-up of solder "gobs" on the joint should be avoided or removed.

) Insulating Joints. The preferred method of insulating electrical joints is by the use of heat-shrink tubing. To apply, cut a piece of heat-shrink tubing of suitable diameter to a one-inch length for covering joints at terminals or connectors, or to a length about 1/2 inch longer than the joint to be insulated, and slide the tubing over the wire before making the joint. After the joint is made, slide the tubing over the joint, and shrink in place with moderate heat.

) Splicing Wires. To repair broken or cut wires that are otherwise sound, the mating ends can be stripped and spliced. A commercial butt splice can be crimped onto the ends to joint them, or a "Western Union" wire splice can be made. The latter is made by stripping 1/4 - 1/2 inch of insulation from the wire ends, holding the ends parallel and facing opposite directions, then twisting each end around the other wire at least three turns. Solder and apply insulation as described above.

) Crimping Terminals. To install a terminal on the end of a wire, strip 1/4 - 1/2 inch of insulation from the end of the wire, apply a one-inch piece of heat-shrink tubing (if the terminals are of the uninsulated type), and insert wire-end into the shank of the terminal. Crimp the shank, and install heat-shrink tubing, if necessary.

stallation. Separate installation procedures are given below for the eight major wiring harnesses.

) Install P10-P5-P11-P16 wiring harness as follows:

(a) Insert the harness into the lower front section of the cabinet.

(b) Connect connector P10 to connector J10.

(c) Connect connector P5 to connector J5.

(d) Connect connector P11 to connector J11.

(e) Connect connector P16 to connector J16.

(a) Insert the harness into the lower front section of the cabinet.

(b) Connect connector P4 to connector J4.

(c) Connect connector P8 to connector J8.

(d) Connect connector P2 to connector J2.

(e) Install the lower front panel and tighten the five captive panel fastener screws.

(f) Connect the input power cable connector, if the front panel location is used.

(3) Install P13-J1 wiring harness as follows:

(a) Insert the harness into the lower front section of the cabinet.

(b) Connect connector P13 to connector J13.

(c) Position connector J1 at the input power location and install the four mounting screws and nuts.

(d) Install the lower front panel and tighten the five captive panel fastener screws.

(e) Connect input power cable connector, to connector J1.

(4) Install P14-J12 wiring harness as follows:

(a) Carefully insert the harness wires up through the grommet in the condenser coil frame.

(b) Feed the P14 end of the harness into the lower section and install the loop clamp, screw and nut that attach it to the lip on the back edge of the right side panel of the casing.

(c) Solder the harness wires to the pins in connector J12.

(d) Position connector J12 in its mounting location in the cabinet partition, and install the four attaching screws and nuts. (This operation will require two persons; one to install the screws through the evaporator intake opening, and the other to hold the connector and install the nuts through the condenser intake opening.)

(e) Install the condenser intake screen and the 12 mounting screws, flat washers, and lock washers.

(f) Connect connector P12 to connector J12.

(g) Install the conditioned air filter element, the filter retaining angle bracket, and the five attaching screws and lock washers.

(h) Install the evaporator intake grille, and the 12 attaching screws and washers.

(i) Install the front fresh air damper control knob, align the setscrew with the flat on the shaft, and tighten the setscrew.

(j) Connect connector P14 to connector J14.

clamps, washer, and nut through the lower front panel opening, and the other to install the screw from the outside of the cabinet.)

(f) Slip the wiring harness into the slot in the back of the base of the mounting bracket for the J18 and J20 connectors, and install the grommet on the harnesses and in the hole in the base of the bracket.

(g) Install the mounting bracket and the four attaching screws, washers, and nuts on the cabinet partition. (This operation will require two persons; one to install the bracket and screws through the evaporator intake opening, and the other to install the washers and nuts through the condenser intake opening.)

(h) Install connectors J18 and J20, and the eight attaching screws, washers, and nuts on the mounting bracket.

(i) Install the evaporator intake grille and the 12 attaching screws and washers.

(j) Install the front fresh air damper knob, align the setscrew with the flat on the shaft, and tighten the setscrew.

(k) Install the condenser intake screen and the 12 attaching screws, flat washers, and lock washers.

(l) Install connectors J17 and J19 on their mounting bracket, and install the eight attaching screws, flat washers, lock washers, and nuts.

(m) Install the lower front panel and tighten the five captive panel fastener screws.

(n) Connect the input power cable connector, if the front panel location is used.

Install P12-P6-J7 wiring harness as follows:

(a) Insert the harness into the evaporator intake opening and install connector J7 and the four attaching screws and nuts. (This operation will require two persons; one to hold the connector and install the nuts through the evaporator intake opening, and the other to install the screws through the top panel opening.

(b) Connect connector P7 to connector J7.

(c) Refer to paragraph 4-15.e. and figure 4-12 and install the top panel assembly.

(d) Connect connector P6 to connector J6.

(e) Connect connector P12 to connector J12.

screws and washers.

(g) Install the evaporator intake grille and the 12 attaching screws and washers.

(h) Install the front fresh air damper knob, aline the setscrew with the flat on the shaft, and tigh setscrew.

(7) Install the P7-P3-heater terminal wiring harness as follows:

(a) Insert the harness into the top panel opening and connect connector P7 to connector J

(b) Connect connector P3 to connector J3.

(c) Install the terminals on the six heater wires on the proper terminal studs on heater elemer install the attaching washers and nuts.

(d) Install the loop clamp and attaching screw on the harness.

(e) Refer to paragraph 4-15.e. and figure 4-12 and install the top panel.

Table 4-4 — WIRE LIST

IDENT NO. (Marking)	TERMINATION		TERMINATION		AWG Wire Size	LENGTH	
	FROM	TERMINAL TYPE	TO	TERMINAL TYPE		IN.	CM
		J1-P13 WIRING HARNESS					
X2A8	J1-A	MS3100R-24-22P	P13-A	MS3106R-24-22SX	8	29	73.7
X3A8	J1-B	MS3100R-24-22P	P13-B	MS3106R-24-22SX	8	29	73.7
X4A8	J1-C	MS3100R-24-22P	P13-C	MS3106R-24-22SX	8	29	73.7
X5A8N	J1-D	MS3100R-24-22P	P13-D	MS3106R-24-22SX	8	29	73.7
		P4-P8-P2 WIRING HARNESS					
X2L14	P4-A	MS3106R-36-14P	P8-G	MS3100R-28-9S	14	30	76.2
X16B14	P4-B	MS3106R-36-14P	P8-B	MS3100R-28-9S	14	30	76.2
X14B14	P4-D	MS3106R-36-14P	P8-C	MS3100R-28-9S	14	30	76.2
X20B14	P4-E	MS3106R-36-14P	P2-A	MS3106R-16-10S	14	25	63.5
X15B14	P4-F	MS3106R-36-14P	P8-D	MS3100R-28-9S	14	30	76.2
X21B14	P4-G	MS3106R-36-14P	P2-B	MS3106R-16-10S	14	25	63.5
X3L14	P4-H	MS3106R-36-14P	P8-E	MS3100R-28-9S	14	30	76.2
X22B14	P4-I	MS3106R-36-14P	P2-C	MS3106R-16-10S	14	25	63.5
X4J14	P4-J	MS3106R-36-14P	P8-F	MS3100R-28-9S	14	30	76.2
X5E16N	P4-K	MS3106R-36-14P	P8-A	MS3100R-28-9S	16	30	76.2
V7B16	P4-L	MS3106R-36-14P	P8-H	MS3100R-28-9S	16	30	76.2
V16B16	P4-N	MS3106R-36-14P	P8-K	MS3100R-28-9S	16	30	76.2
V6B16	P4-P	MS3106R-36-14P	P8-L	MS3100R-28-9S	16	30	76.2
V3B16	P4-Q	MS3106R-36-14P	P8-M	MS3100R-28-9S	16	30	76.2

(Wiring)	FROM	TERMINAL TYPE	TO	TERMINAL TYPE	SIZE	IN.	CM
			P10-P5-P11-P16 WIRING HARNESS				
3C16	P10-L	MS3106R-36-14PX	P5-A	MS3106R-12S-3S	16	12	30.5
S16	P10-M	MS3106R-36-14PX	P5-B	MS3106R-12S-3S	16	12	30.5
E16	P10-N	MS3106R-36-14PX	P16-A	MS3106R-12S-3SY	16	12	30.5
B16	P10-Q	MS3106R-36-14PX	P16-B	MS3106R-12S-3SY	16	12	30.5
G16	P10-B	MS3106R-36-14PX	P11-G	MS3106R-24-11S	16	22	55.9
G16	P10-D	MS3106R-36-14PX	P11-H	MS3106R-24-11S	16	22	55.9
1A16	P10-F	MS3106R-36-14PX	P11-A	MS3106R-24-11S	16	22	55.9
D16	P10-H	MS3106R-36-14PX	P11-B	MS3106R-24-11S	16	22	55.9
B10	P10-A	MS3106R-36-14PX	P11-D	MS3106R-24-11S	10	22	55.9
B10	P10-C	MS3106R-36-14PX	P11-E	MS3106R-24-11S	10	22	55.9
0B10	P10-E	MS3106R-36-14PX	P11-F	MS3106R-24-11S	10	22	55.9
			P14-J12 WIRING HARNESS				
6E14	P14-B	MS3106R-28-9PW	J12-B	MS3100R-28-9SZ	14	54	137.2
5E14	P14-C	MS3106R-28-9PW	J12-C	MS3100R-28-9SZ	14	54	137.2
4E14	P14-D	MS3106R-28-9PW	J12-D	MS3100R-28-9SZ	14	54	137.2
3B14	P14-E	MS3106R-28-9PW	J12-E	MS3100R-28-9SZ	14	54	137.2
2B14	P14-F	MS3106R-28-9PW	J12-F	MS3100R-28-9SZ	14	54	137.2
1B14	P14-G	MS3106R-28-9PW	J12-G	MS3100R-28-9SZ	14	54	137.2
25B16	P14-H	MS3106R-28-9PW	J12-H	MS3100R-28-9SZ	16	54	137.2
24B16	P14-J	MS3106R-28-9PW	J12-J	MS3100R-28-9SZ	16	54	137.2
23B16	P14-K	MS3106R-28-9PW	J12-K	MS3100R-28-9SZ	16	54	137.2
8D16	P14-L	MS3106R-28-9PW	J12-L	MS3100R-28-9SZ	16	54	137.2
5E16	P14-M	MS3106R-28-9PW	J12-M	MS3100R-28-9SZ	16	54	137.2
			P12-P6-J7 WIRING HARNESS				
16F14	P12-B	MS3106R-28-9PZ	J7-B	MS3100R-28-9SX	14	18	45.7
15F14	P12-C	MS3106R-28-9PZ	J7-C	MS3100R-28-9SX	14	18	45.7
14F14	P12-D	MS3106R-28-9PZ	J7-D	MS3100R-28-9SX	14	18	45.7
13C14	P12-E	MS3106R-28-9PZ	J7-E	MS3100R-28-9SX	14	18	45.7
12C14	P12-F	MS3106R-28-9PZ	J7-F	MS3100R-28-9SX	14	18	45.7
11C14	P12-G	MS3106R-28-9PZ	J7-G	MS3100R-28-9SX	14	18	45.7
25C16	P12-H	MS3106R-28-9PZ	J7-H	MS3100R-28-9SX	16	18	45.7
24C16	P12-J	MS3106R-28-9PZ	J7-J	MS3100R-28-9SX	16	18	45.7
23C16	P12-K	MS3106R-28-9PZ	J7-K	MS3100R-28-9SX	16	18	45.7
18E16	P12-L	MS3106R-28-9PZ	P6-B	MS3106R12S-3S	16	18	45.7
15F16	P12-M	MS3106R-28-9PZ	P6-A	MS3106R12S-3S	16	18	45.7
			P7-P3 HEATER ELEMENT WIRING HARNESS				
16G14	P7-B	MS3106R-28-9PX	HR1-A	MS25036-108	14	26	66.0
15G14	P7-C	MS3106R-28-9PX	HR2-A	MS25036-108	14	21	53.3
14G14	P7-D	MS3106R-28-9PX	HR3-A	MS25036-108	14	19	48.3
13D14	P7-E	MS3106R-28-9PX	HR4-A	MS25036-108	14	12	30.5
12D14	P7-F	MS3106R-28-9PX	HR5-A	MS25036-108	14	15	38.1
11D14	P7-G	MS3106R-28-9PX	HR6-A	MS25036-108	14	19	48.3
25D16	P7-H	MS3106R-28-9PX	P3-C	MS3106R-14S-7S	16	15	38.1
24D16	P7-J	MS3106R-28-9PX	P3-B	MS3106-14S-7S	16	15	38.1

IDENT NO. (Marking)	TERMINATION FROM	TERMINAL TYPE	TERMINATION TO	TERMINAL TYPE	AWG Wire SIZE	LE IN.
		HEATER ELEMENT INTERCONNECTING LEADS				
X19B14	HR3-B	MS25036-108	HR4-B	MS25036-108	14	6
X18B14	HR2-B	MS25036-108	HR5-B	MS25036-108	14	16
X17B14	HR1-B	MS25036-108	HR6-B	MS25036-108	14	25
		J17-J18 WIRING HARNESS				
X2Z8	J17-A	13211E8399C24-22S	J18-A	MS3100R24-22P	8	60
X3Z8	J17-B	13211E8399C24-22S	J18-B	MS3100R24-22P	8	60
X4Z8	J17-C	13211E8399C24-22S	J18-C	MS3100R24-22P	8	60
X5Z8N	J17-D	13211E8399C24-22S	J18-D	MS3100R24-22P	8	60
		J19-J20 WIRING HARNESS				
X5G16N	J19-A	13211E8399C28-9P	J20-A	MS3100R28-9S	16	60
X16Z14	J19-B	13211E8399C28-9P	J20-B	MS3100R28-9S	14	60
X14Z14	J19-C	13211E8399C28-9P	J20-C	MS3100R28-9S	14	60
X15Z14	J19-D	13211E8399C28-9P	J20-D	MS3100R28-9S	14	60
X3Y14	J19-E	13211E8399C28-9P	J20-E	MS3100R28-9S	14	60
X4Y14	J19-F	13211E8399C28-9P	J20-F	MS3100R28-9S	14	60
X2Y14	J19-G	13211E8399C28-9P	J20-G	MS3100R28-9S	14	60
V7Z16	J19-H	13211E8399C28-9P	J20-H	MS3100R28-9S	16	60
V15Z16	J19-J	13211E8399C28-9P	J20-J	MS3100R28-9S	16	60
V16Z16	J19-K	13211E8399C28-9P	J20-K	MS3100R28-9S	16	60
V6Z16	J19-L	13211E8399C28-9P	J20-L	MS3100R28-9S	16	60
V3Z16	J19-M	13211E8399C28-9P	J20-M	MS3100R28-9S	16	60
		CONTROL PANEL J8 WIRING HARNESS				
X5F16N	J8-A	13211E8399C28-9P	CONT PNLGND	MS25036-154	16	4
X16A14	J8-B	13211E8399C28-9P	S/WC-3A	13211E8288	14	9
X14A14	J8-C	13211E8399C28-9P	S/WD-4C	13211E8288	14	9
X15A14	J8-D	13211E8399C28-9P	S/WD-4A	13211E8288	14	9
X3M14	J8-E	13211E8399C28-9P	S/WD-42	13211E8288	14	9
X4K14	J8-F	13211E8399C28-9P	S/WD-41	13211E8288	14	9
X2M14	J8-G	13211E8399C28-9P	S/WC-32	13211E8288	14	9
V7A16	J8-H	13211E8399C28-9P	S/WA-ID	13211E8288	16	9
V16A16	J8-K	13211E8399C28-9P	S/WA-1A	13211E8288	16	9
V6A16	J8-L	13211E8399C28-9P	S/WB-2B	13211E8288	16	9
V3C16	J8-M	13211E8399C28-9P	S/WB-22	13211E8288	16	8
V3D16	S/WB-22	13211E8288	S/WA-11	13211E8288	16	3
V3E16	S/WA-11	13211E8288	S1-R	MS25036-153	16	7
V15A16	J8-J	13211E8399C28-9P	S/WA-1B	13211E8288	16	9
		CONTROL PANEL INTERCONNECTING LEAD				

Table 4-4 — WIRE LIST (cont)

IDENT NO. (Marking)	TERMINATION		TERMINATION		AWG Wire Size	LENGTH	
	FROM	TERMINAL TYPE	TO	TERMINAL TYPE		IN.	CM
			JUNCTION BOX J13 WIRING HARNESS				
X2B8	J13-A	MS3102R-24-22PX	TB1-1	MS25036-116	8	7	17.8
X3B8	J13-B	MS3102R-24-22PX	TB1-2	MS25036-116	8	7	17.8
X4B8	J13-C	MS3102R-24-22PX	TB1-3	MS25036-116	8	7	17.8
X5B8N	J13-D	MS3102R-24-22PX	JB-GND	MS25036-115	8	8	20.3
			JUNCTION BOX J4 WIRING HARNESS				
X5D16N	J4-K	MS3102R-36-14S	JB-GND	MS25036-153	16	14	35.6
W7C16	J4-L	MS3102R-36-14S	TB2-8	MS25036-153	16	16	40.6
W15C16	J4-M	MS3102R-36-14S	TB2-9	MS25036-153	16	14	35.6
W16C16	J4-N	MS3102R-36-14S	K1-X2	MS25036-153	16	27	68.6
W6C16	J4-P	MS3102R-36-14S	K8-X1	MS25036-153	16	27	68.6
X16C14	J4-B	MS3102R-36-14S	TB2-5	MS25036-153	14	17	43.2
X14C14	J4-D	MS3102R-36-14S	TB2-6	MS25036-153	14	17	43.2
X15C14	J4-F	MS3102R-36-14S	TB2-7	MS25036-153	14	16	40.6
X3K14	J4-H	MS3102R-36-14S	TB1-5	MS25036-154	14	12	30.5
X4H14	J4-J	MS3102R-36-14S	TB1-6	MS25036-154	14	13	33.0
X2K14	J4-A	MS3102R-36-14S	TB1-4	MS25036-154	14	10	25.4
W3A16	J4-Q	MS3102R-36-14S	XF2-2	MS25036-153	16	22	55.9
X20A14	J4-E	MS3102R-36-14S	K7-A1	MS25036-108	14	22	55.9
X21A14	J4-G	MS3102R-36-14S	K7-B1	MS25036-108	14	22	55.9
X22A14	J4-1	MS3102R-36-14S	K7-C1	MS25036-108	14	22	55.9
			JUNCTION BOX J10 WIRING HARNESS				
X6A10	J10-A	MS3102R36-14SX	CB-C2	13211E8288	10	7	17.8
X9A10	J10-C	MS3102R36-14SX	CB-B2	13211E8288	10	7	17.8
X10A10	J10-E	MS3102R36-14SX	CB-A2	13211E8288	10	7	17.8
X3F16	J10-B	MS3102R36-14SX	K8-B2	MS25036-108	16	18	45.7
X2F16	J10-D	MS3102R36-14SX	K8-A2	MS25036-108	16	19	48.3
W11B16	J10-F	MS3102R36-14SX	TB2-4	MS25036-153	16	12	30.5
W13B16	J10-L	MS3102R36-14SX	K9-X2	MS25036-153	16	20	50.8
W7D16	J10-N	MS3102R36-14SX	TB2-8	MS25036-153	16	10	25.4
W5R16	J10-M	MS3102R36-14SX	TB2-3	MS25036-153	16	13	33.0
W9C16	J10-H	MS3102R36-14SX	J10-Q	MS3102R36-14SX	16	2	5.1
			JUNCTION BOX J14 WIRING HARNESS				
W15D16	J14-M	MS3102R-28-9SW	TB2-9	MS25036-153	16	10	25.4
W18C16	J14-L	MS3102R-28-9SW	K1-X1	MS25036-153	16	6	15.2
X11A14	J14-G	MS3102R-28-9SW	K1-A2	MS25036-108	14	9	22.9
X12A14	J14-F	MS3102R-28-9SW	K1-B2	MS25036-108	14	10	25.4
X13A14	J14-E	MS3102R-28-9SW	K1-C2	MS25036-108	14	10	25.4
X14D14	J14-D	MS3102R-28-9SW	TB2-6	MS25036-153	14	7	17.8
X15D14	J14-C	MS3102R-28-9SW	TB2-7	MS25036-153	14	8	20.3

Marking)	FROM	TERMINAL TYPE	TO	TERMINAL TYPE	Size	IN.	CM
			JUNCTION BOX INTERNAL WIRING HARNESS				
X28A16	XF1-4	MS25036-153	T-H2	MS25036-106	16	15	38.1
X29A16	XF1-2	MS25036-153	T-H1	MS25036-106	16	16	40.6
X2C10	K7-A2	MS25036-112	TB1-1	MS25036-157	10	17	43.2
X2H14	K1-A1	MS25036-108	TB1-1	MS25036-154	14	16	40.6
X7A10	K9-B2	MS25036-112	CB-B1	13211E8288	10	17	43.2
X8A10	K9-C2	MS25036-112	CB-A1	13211E8288	10	18	45.7
X26A16	XF1-3	MS25036-153	CB-NO		16	15	38.1
X3C10	K7-B2	MS25036-112	TB1-2	MS25036-157	10	18	45.7
X3H14	K1-B1	MS25036-108	TB1-2	MS25036-154	14	17	43.2
X4C10	K7-C2	MS25036-112	TB1-3	MS25036-157	10	17	43.2
X4F14	K1-C1	MS25036-108	TB1-3	MS25036-154	14	15	38.1
V5J16	K8-X2	MS25036-153	TB2-2	MS25036-153	16	8	20.3
V18B16	K1-X1	MS25036-153	TB2-1	MS25036-153	16	8	20.3
V5L16N	K9-X1	MS25036-153	JB-GND	MS25036-153	16	11	27.9
V5K16	K9-X1	MS25036-153	TB2-2	MS25036-153	16	5	12.7
V5G16	K7-X1	MS25036-153	TB2-1	MS25036-153	16	5	12.7
X2P16	TB1-4	MS25036-154	CB-C		16	8	20.3
X27A16	XF1-1	MS25036-153	TB1-5	MS25036-154	16	9	22.9
X6C10	K9-A2	MS25036-112	CB-C1	13211E8288	10	17	43.2
			JUNCTION BOX RELAY LEAD ASSEMBLY				
X4D10	K7-C2	MS25036-112	K9-C1	MS25036-112	10	6	15.2
X4E16	K8-C2	MS25036-108	K9-C1	MS25036-108	16	13	33.0
X3D10	K7-B2	MS25036-112	K9-B1	MS25036-112	10	6	15.2
X3E16	K8-B2	MS25036-108	K9-B1	MS25036-108	16	13	33.0
X2D10	K7-A2	MS25036-112	K9-A1	MS25036-112	10	6	15.2
X2E16	K8-A2	MS25036-108	K9-A1	MS25036-108	16	13	33.0
			RFI FILTER ASSEMBLY LEADS				
X30A16	T-X-2	MS25036-153	FL1	13216E4517	16	23	58.4
X32A16	FL-1	13216E4517	CR-1	13211E8288	16	6	15.2
X31A16	T-X-1	MS25036-153	FL-2	13216E4517	16	23	58.4
X33A16	FL2	13216E4517	CR-4	13211E8288	16	6	15.2
V18A16	TB2-1	MS25036-153	FL3	13216E4517	16	18	45.7
V17A16	FL3	13216E4517	CR-2	13211E8288	16	6	15.2
V2A16	XF2-1	MS25036-153	FL4	13216E4517	16	18	45.7
V1A16	FL4	13216E4517	CR-3	13211E8288	16	6	15.2
			TIME DELAY RELAY WIRING HARNESS				
V11D16	K6-2	13216E6182-1	K7-X2	MS25036-153	16	9	22.9
V13A16	K6-3	13216E6182-1	K9-X2	MS25036-153	16	16	40.6
V5N16	K6-5	13216E6182-1	TB2-3	MS25036-153	16	11	27.9
V11E16	K6-1	13216E6182-1	K6-2	13216E6182-1	16	1	2.5

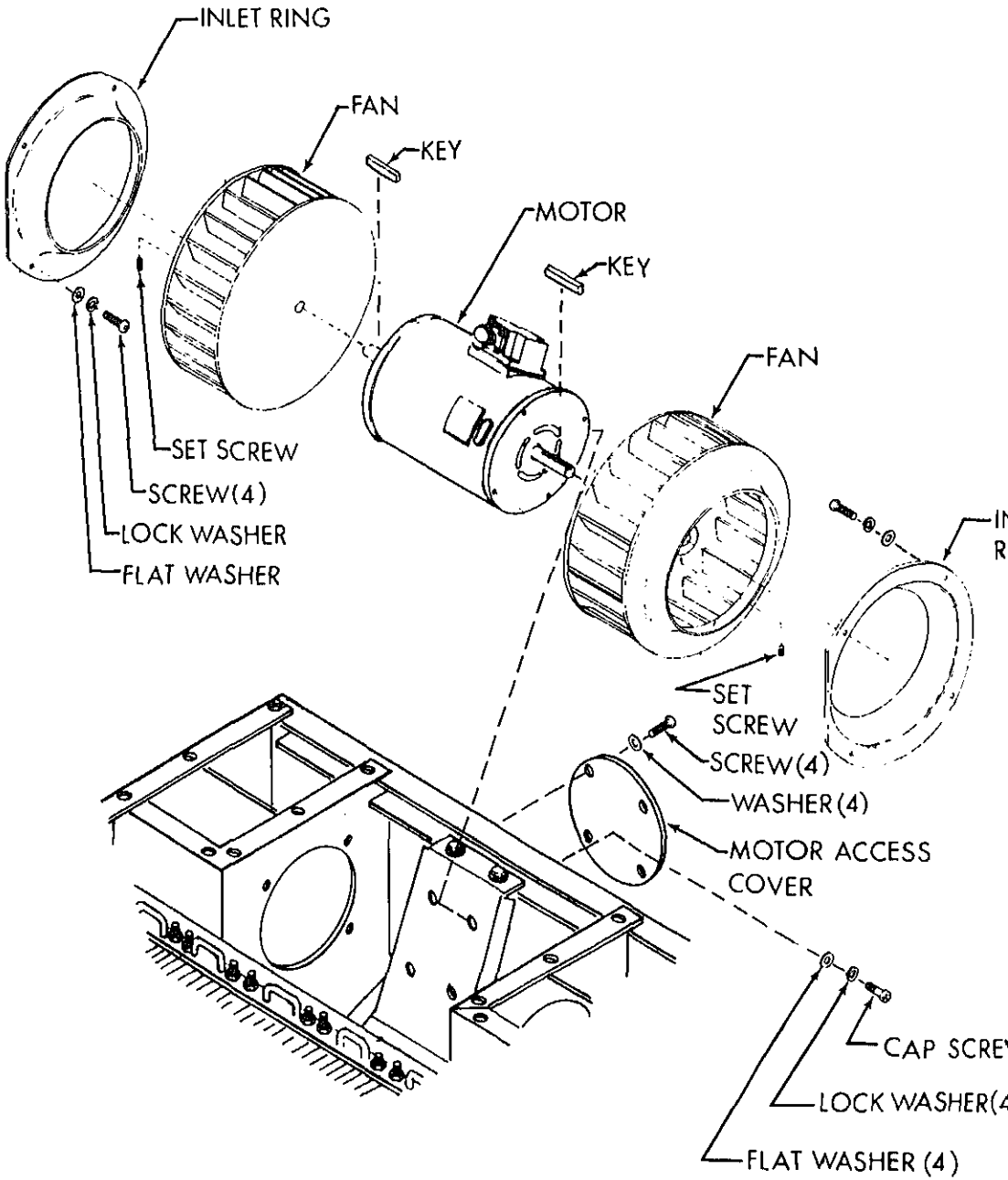
DENT NO. (arking)	TERMINATION		TERMINATION		AWG Wire Size	LENGTH	
	FROM	TERMINAL TYPE	TO	TERMINAL TYPE		IN.	CM
			JUNCTION BOX INTERCONNECTING LEADS				
11C16	K7-X2	MS25036-153	TB2-4	MS25036-153	16	4	10.2
5H16	TB2-2	MS25036-153	TB2-1	MS25036-153	16	3	7.6
5M16	TB2-2	MS25036-153	TB2-3	MS25036-153	16	3	7.6
4G14	TB1-3	MS25036-154	TB1-6	MS25036-154	14	5	12.7
3J14	TB1-2	MS25036-154	TB1-5	MS25036-154	14	5	12.7
2J14	TB1-1	MS25036-154	TB1-4	MS25036-154	14	5	12.7
			HP-LP SWITCH J16 WIRING HARNESS				
7F16	J16-A	MS3102R12S-3PY	S6-1	MS25036-153	16	5	12.7
9A16	J16-B	MS3102R12S-3PY	S5-2	MS25036-153	16	5	12.7
			HP-LP SWITCH INTERCONNECTING LEAD				
8A16	S5-1	MS25036-153	S6-2	MS25036-153	16	4	10.2
			HEATER OVERHEAT THERMOSTAT LEADS				
19A12	S3-6	13214E4036	HR3-B	MS25036-112	12	4	10.2
17A12	S3-4	13214E4036	HR1-B	MS25036-112	12	12	30.5
18A12	S3-5	13214E4036	HR5-B	MS25036-112	12	13	33.0
			GROUND LEAD				
5C8N	FRGND	MS25036-116	JB-GND	MS25036-116	8	36	91.4

7. EVAPORATOR FANS AND FAN MOTOR

See figure 4-28.

Description. The two evaporator fans are centrifugal squirrel cage type impellers mounted on the s a single fan motor. The impellers are left and right handed to accommodate the rotational direction shaft and are, therefore, NOT interchangeable. The fan motor is an induction type with a doub shaft. It operates on 208 volt ac, 3-phase, 400 hertz power. It has sealed bearings and built-in, self- ting, thermal overload, overcurrent protectors. The motor requires no lubrication, and the only auth organizational maintenance actions are: routine visual inspection and cleaning; checking mountir attaching hardware for tightness and security; and electrical testing to determine the cause of a ma tion or unsatisfactory performance. The fan and motor assembly is mounted near the back of the section of the cabinet behind the evaporator coil and heater elements.

Inspection/Testing. The fans and fan motor should be mechanically inspected, and the fan motor s


INLET RING
FAN
KEY
MOTOR
KEY
FAN
SET SCREW
SCREW(4)
LOCK WASHER
FLAT WASHER
SET SCREW
SCREW(4)
WASHER(4)
MOTOR ACCESS COVER
CAP SCRE
LOCK WASHER(4
FLAT WASHER (4)

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Disconnect input power from the air conditioner before performing any maintenance or disassembly of any electrical components. The voltages used can be lethal.

1) Disconnect input power at its source.

2) Refer to paragraph 4-15.b. and figure 4-12 and remove the top panel from the cabinet.

CAUTION

Do not exert excessive force on the blades of the impellers when making the following mechanical checks.

3) Thoroughly inspect the fans for damage, bent blades, and for proper clearance.

4) Check motor for rotational freedom by spinning one of the impellers. If there is any stiffness o binding, remove the motor for further repair.

5) Check motor bearings for lateral or end play. If there is excessive lateral or end play, remove th motors for further repair.

6) Electrically test the motor as follows:

(a) Disconnect wiring harness connector P3 from motor connector J3.

(b) Use a continuity tester or a multimeter set on the lowest OHMS scale to check continuity betwee pins A and B, A and C, and B and C in connector J3. If there is no continuity between any pair c pins, the motor winding is open.

(c) Use a continuity tester or a multimeter set on the lowest OHMS scale to check for continuity be tween each pin in connector J3 (A, B, and C) and the motor housing. If there is continuity betwee any pin and the housing, the motor winding is shorted.

(d) Use an insulation tester, a "megger," or a multimeter set on high OHMS scale to test stator in sulation by checking between each pin in connector J3 (A, B, and C) and the motor housing. A reading of less than 0.5 megohms indicates insulation failure.

NOTE

If all the above inspections and tests are satisfactory, but the motor will still not operate properly, notify direct support maintenance, who may desire to make further tests before it is removed.

Removal. Assuming that the top panel has been removed and connector P3 has been disconnected t perform the above tests, proceed with removal of the evaporator fan motor as follows:

1) Remove the four screws, flat washers, and lock washers that attach each of the inlet rings to the al ducts at the outboard sides of the fans, and remove the rings.

2) Remove the four mounting screws and washers and remove the evaporator fan motor access cove

(4) Raise the fan and motor assembly straight up out of the top panel opening being ca damage the fans.

(5) Loosen the two setscrews in each fan hub, and remove the fans and keys from the mo difficulty is encountered in removing the fans from the shaft, thread two 5/16 - 18 UNC scr threaded holes provided in the hub of each fan to serve as jackscrews. Tighten each scr increments until the fan is forced off the shaft.

WARNING

Clean parts in a well ventilated area. Avoid inhalation of solvent fumes and prolon exposure of skin to cleaning solvent. Wash exposed skin thoroughly.

Dry cleaning solvent (Fed. Spec. P-D-680) used to clean parts is potentially dangerou personnel and property.

Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38° 50°C).

Wear eye protection when blowing solvent from parts. Air pressure should not exceed 30 (2.1 kg/cm²).

d. Cleaning. If the fans are excessively dirty, wash in a solution of water and a detergent, or c solvent, (Fed. Spec. P-D-680), and blow dry.

e. Repair/Replacement. Route the fans and/or motor to direct support maintenance for repai ment, as appropriate.

f. Installation. Install the evaporator fan assembly as follows:

CAUTION

Do not pound the fans onto the motor shaft; motor bearings will be damaged. If difficulty is countered, dress out rough spots on the shaft or keys with a fine file, stone, or abrasive c Sparingly apply a coating of light oil to ease assembly.

(1) Install the keys in the shaft keyways and install the fans on the motor shaft. The end should be flush with the inner surface of the fan hub. Tighten the setscrew on the key torque the other set screw, then torque the setscrew on the key. Torque to 78-82 i (898-945 meter grams).

(2) Position the fan and motor on the motor mounting bracket and install the four mounting washers, and lock washers. (This operation will require two persons; one to hold the position through the top panel opening, and the other to install the washers and screws access cover opening.)

(3) Install the inlet ring and four attaching screws, flat washers, and lock washers on the a outboard side of each fan. Be sure the inlet rings are oriented properly with the flat sid

adequate clearance during rotation.

) Install the access cover, and four attaching screws and washers on the upper back panel.

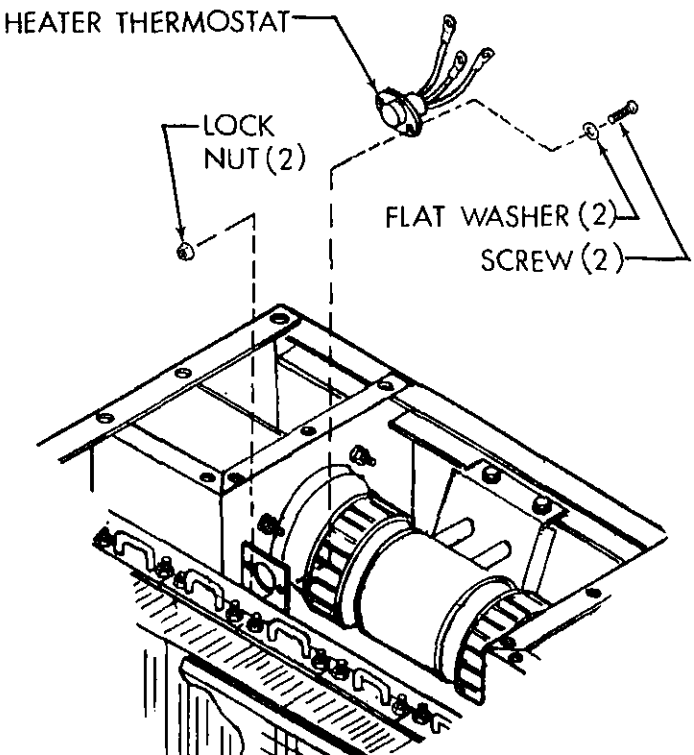
) Connect wiring harness connector P3 to connector J3 on the motor.

) Refer to paragraph 4-25.e. and figure 4-12 and install the top panel on the cabinet.

) Connect input power at its source.

HEATER THERMOSTAT See figure 4-29.

escription. The heater thermostat is a temperature operated switch containing three pairs of contacts. A
nap-acting, bi-metallic disc serves as a thermal element. The contacts open on temperature rise a
94°F (90°C) ± 9°F (5°C) and automatically reset closed at 142°F (61°C) ± 16°F (9°C). The thermostat is
ounted on the top support bracket for the heating elements, in the upper section of the cabinet. Each o
e three leads from the thermostat are connected to one of the interconnected B terminals of one pair o
eating elements.



Disconnect input power from the air conditioner before performing any maintenance or disassembly of any electrical components. The voltage used can be lethal.

Removal. Remove the heater thermostat as follows:

(1) Disconnect input power at its source.

(2) Refer to paragraph 4-15.b. and figure 4-12 and remove the top panel from the cabinet.

(3) Remove the nuts, washers, and heater thermostat lead terminals from the three heater element B terminal studs.

(4) Remove the two screws, nuts, and washers that attach the thermostat to its mounting bracket, and remove the thermostat.

Testing. With the thermostat at room temperature, use a continuity tester or a multimeter set on the lowest OHMS scale to check for continuity between each pair of leads (4 and 6, 4 and 5, and 5 and 6). If there is no continuity between any pair of leads, the thermostat is defective.

NOTE

A full operational test can be performed by heating the thermostat until a continuity check indicates that the contacts have opened, then allowing it to cool until the switch has reset.

Installation. Install the heater thermostat as follows:

(1) Position the thermostat on its mounting bracket, and install the two attaching screws, washers, and nuts.

(2) Install the thermostat lead terminals and the attaching washers and nuts on the proper heater element B terminal studs.

(3) Refer to paragraph 4-15.e. and figure 4-12 and install the top panel on the cabinet.

(4) Connect input power at its source.

29. HEATER ELEMENTS

See figure 4-30.

Description. Heating is provided by six corrosion resistant steel sheathed resistance heating elements. The heating elements are equally spaced across the entire width of the cabinet and are installed directly behind the evaporator coil in the upper section of the cabinet. Each element is individually mounted and can be separately removed. In the LO HEAT mode, power is supplied to only three of the elements through a relay contactor controlled by the temperature thermostat in the control panel. In the HI HEAT mode, power is supplied directly to the other three elements and also to the controlled elements through the same relay contactor. Overheat protection is provided to all six elements by the heater thermostat.

Removal. Remove heater elements as follows:

WARNING

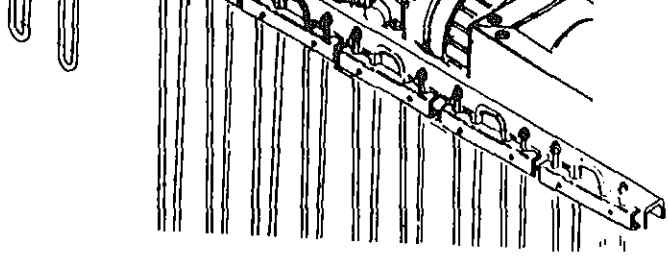


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Figure 4-30. Heater Elements

(1) Disconnect input power at its source.

(2) Refer to paragraph 4-15.b. and figure 4-12 and remove the top panel from the cabinet.

(3) Remove the nuts, washers, and wiring terminals from the stud on each end of the affecte element.

(4) Loosen the two captive panel fastener screws in the bracket that attaches the element to support, and remove the bracket.

(5) Pull the element straight up out of the top panel opening.

c. Inspection/Testing. Visually inspect the element for damage, deformation, damaged terminal cracked or broken sheath, and burned spots. Replace element if damage is evident. Use a c tester, or a multimeter set on the lowest OHMS scale to check for continuity between the two studs. Replace element if continuity is not found.

d. Installation. Install heater elements as follows:

(1) Insert the element straight down through the top panel opening.

(2) Position the attaching bracket and tighten the two panel fastener screws.

(3) Install the wiring terminals, washers, and nuts on the studs at each end of the heater elen

(4) Refer to paragraph 4-15.e. and figure 4-12 and install the top panel on the cabinet.

(5) Connect input power at its source.

4-30. CONDENSER FAN GUARD

See figure 4-31.

a. Description. The condenser fan guard is a safety device designed both to protect personnel fr sonal injury and to protect the fan from damage. The guard is installed over the circular conde discharge opening in the right hand side of the lower back panel.

b. Removal. To remove the guard, remove the six mounting screws and pull the guard off the flange the opening.

c. Cleaning/Inspection. Clean the guard in a solution of water and a detergent, if necessary; ri clear water. Inspect for broken welds or bent rods.

d. Installation. Position the guard over the opening and install the six mounting screws.

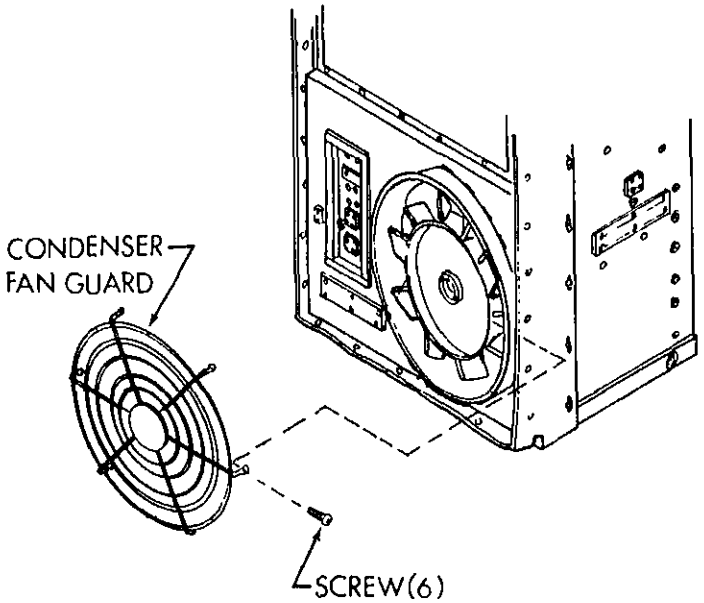

Figure 4-31. Condenser Fan Guard

4-31. CONDENSER FAN

See figure 4-32.

a. Description. The condenser fan is an axial impeller made as a single casting. It is attached to th the condenser fan motor by a key and two setscrews. It is located in a shroud built into the lo panel of the cabinet.

b. Removal. Remove the condenser fan as follows:

(1) Remove the six mounting screws and remove the condenser fan guard.

(2) Loosen the two setscrews in the hub of the fan and pull the fan off the motor shaft.

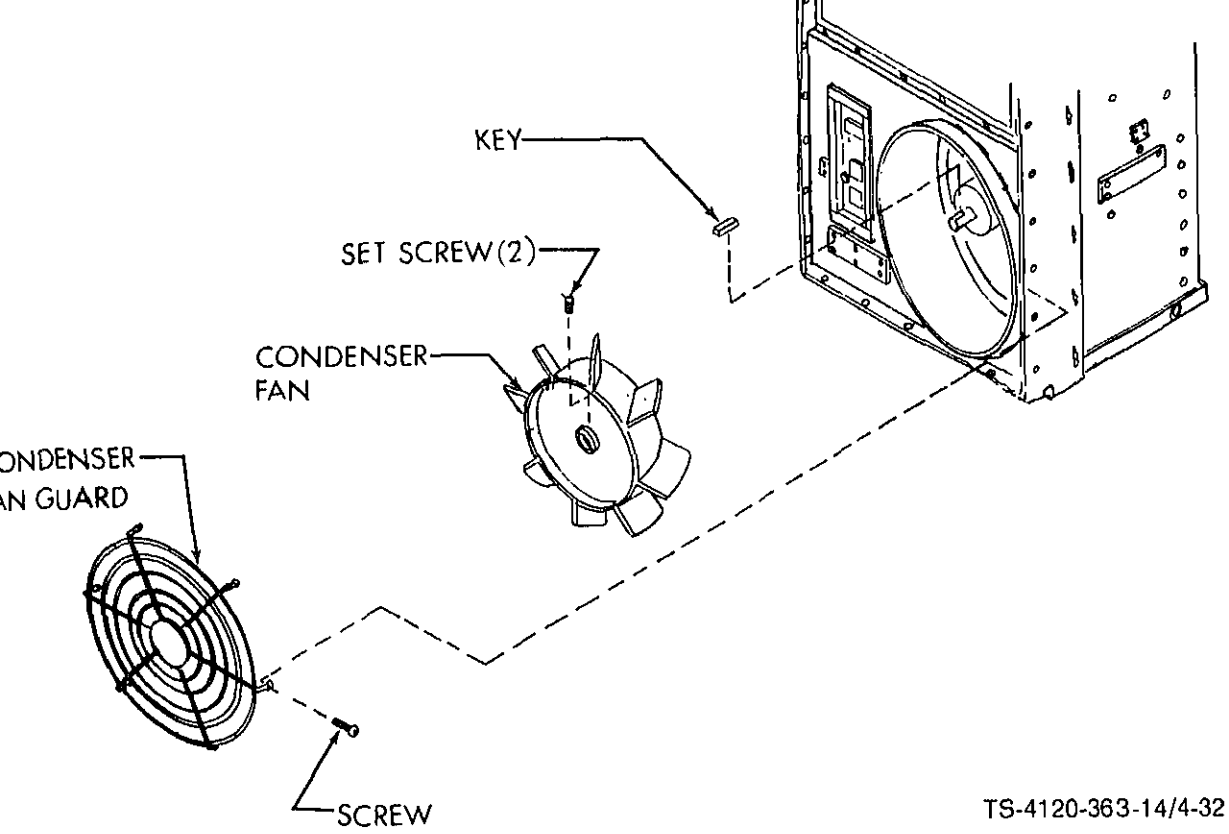

Figure 4-32. Condenser Fan

CAUTION

Do not pound the fan onto the motor shaft; motor bearings will be damaged. If difficulty is encountered, dress out rough spots on the shaft or key with a fine file, stone, or abrasive cloth. Sparingly apply a coating of light oil to ease assembly.

(1) Install the key in the keyway on the motor shaft.

(2) Slip the fan onto the motor shaft and key until the end of the shaft is flush with the outer surface of hub in the center of the fan.

(3) Tighten the setscrew over the key finger tight, torque the other setscrew, then torque the setsc over the key. Torque to 78-82 inch pounds (898-945 meter grams).

(4) Carefully check alinement of impeller; spin impeller by hand to make sure of clearance from shroud during rotation.

(5) Install the fan guard and six mounting screws.

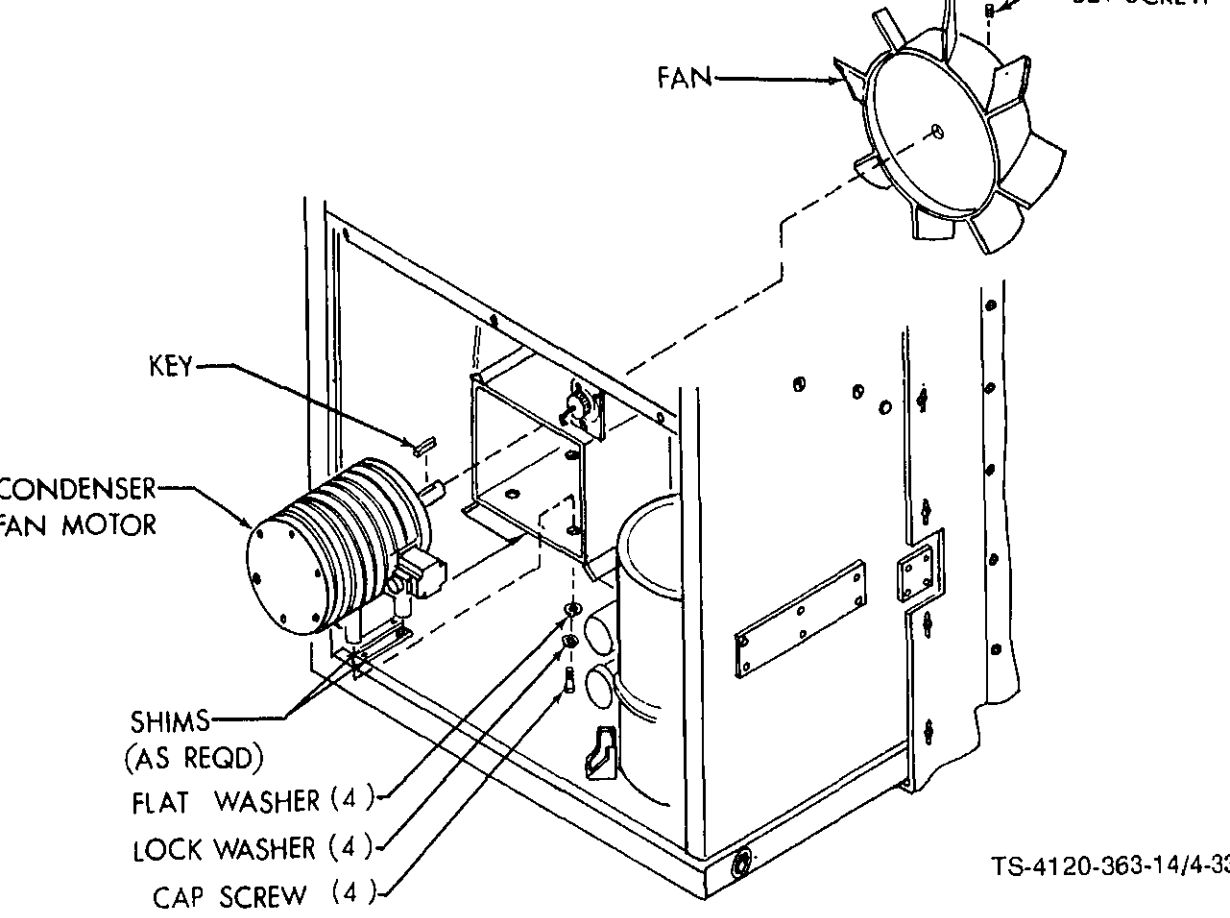

Figure 4-33. Condenser Fan Motor

tions are: routine visual inspections and cleaning; checking mounting and attaching hardware for tig ness and security; and electrical testing to determine the cause of a malfunction or unsatisfactory p formance. The motor is installed on a mounting bracket that is part of the lower back panel of the cabi

b. Inspection/Testing. The motor should be mechanically inspected and electrically tested before i removed from the air conditioner for repair or replacement. Malfunction symptoms, or unsatisfactory p formance characteristics, will usually indicate the nature of the problem. Inspect and test the motor follows:

WARNING

Disconnect input power from the air conditioner before performing any maintenance or disassembly of any electrical components. Voltages used can be lethal.

(1) Disconnect input power at its source.

any pin and the housing, the motor winding is shorted.

(e) Use an insulation tester, a "megger," or a multimeter set on high OHMS scale to test stator insulation by checking between each pin in connector J3 (A, B and C) and the motor housing. A reading of less than 0.5 megohms indicates insulation failure.

NOTE

If all the above inspections and tests are satisfactory, but the motor will still not operate properly, notify direct support maintenance, who may desire to make further tests before it is removed.

Removal. There are two methods that may be used to remove the condenser fan motor from the air conditioner, both of which require removal or disassembly of other components. This procedure covers the removal of the motor through the lower front panel opening. The alternate method is to remove the lower back panel with the motor still attached and then remove the motor from its mounting bracket. Assuming that the fan guard and lower front panel have been removed, and connector P2 has been disconnected to perform the above inspections and tests, remove the motor through the lower front panel opening as follows:

(1) Loosen the two setscrews in the hub of the fan and remove the fan and key from the motor shaft.

(2) Refer to paragraph 4-25.b. and figure 4-24 and remove the junction box.

(3) Carefully push the wiring harnesses aside to allow access to the condenser fan motor.

(4) Remove the four screws, flat washers and lock washers that attach the base of the motor to its mounting bracket.

(5) Lift the motor out of the cabinet through the lower front panel opening.

NOTE

If there are shims installed between the base of the motor and its mounting bracket, be sure to mark them so that they may be installed in the same location.

Repair. Route the unserviceable motor to direct support maintenance for repair.

Installation. Install the condenser fan motor as follows:

(1) Position the motor on its mounting bracket.

reinstall them in the same location.

(2) Install the four screws, flat washers, and lockwashers that attach the base of the motor to its mo ing bracket.

CAUTION

Do not pound the fan onto the motor shaft; motor bearings will be damaged. If difficulty is encountered, dress out rough spots on the shaft or key with a fine file, stone, or abrasive cloth. Sparingly apply a coating of light oil to ease assembly.

(3) Install the key in the keyway on the motor shaft, then slip the fan on the shaft and key until the e the shaft is flush with the surface of the hub in the center of the fan.

(4) Tighten the setscrew over the key finger tight, torque the other setscrew, then torque the sets over the key. Torque to 78-82 inch pounds (898-945 meter grams).

(5) Carefully check alignment of the impeller; spin the impeller by hand to make sure of clearance the shroud during rotation.

(6) Install the fan guard and the six mounting screws.

(7) Refer to paragraph 4-25.g. and figure 4-24 and install the junction box.

4-33. LOWER BACK PANEL

See figure 4-34.

a. Description. The lower back panel is a welded and riveted assembly that includes the shroud for the denser fan impeller and the mounting bracket for the condenser fan motor.

b. Removal. The condenser fan and motor may be removed in accordance with the procedure in parag 4-32 prior to removal of the lower back panel, or the panel may be removed with the fan and moto stalled as part of the assembly. In order that this procedure may be used as an alternate metho removal of the condenser fan and motor, it is written as though the fan and motor are installed o panel. Remove the lower back panel as follows:

WARNING

Disconnect input power from the air conditioner before performing any maintenance or disassembly of any electrical components. Voltages used can be lethal.

(1) Disconnect input power at its source.

(2) Loosen the five captive panel fastener screws, and remove the lower front panel.

(3) Disconnect wiring harness connector P2 from condenser fan motor connector J2.

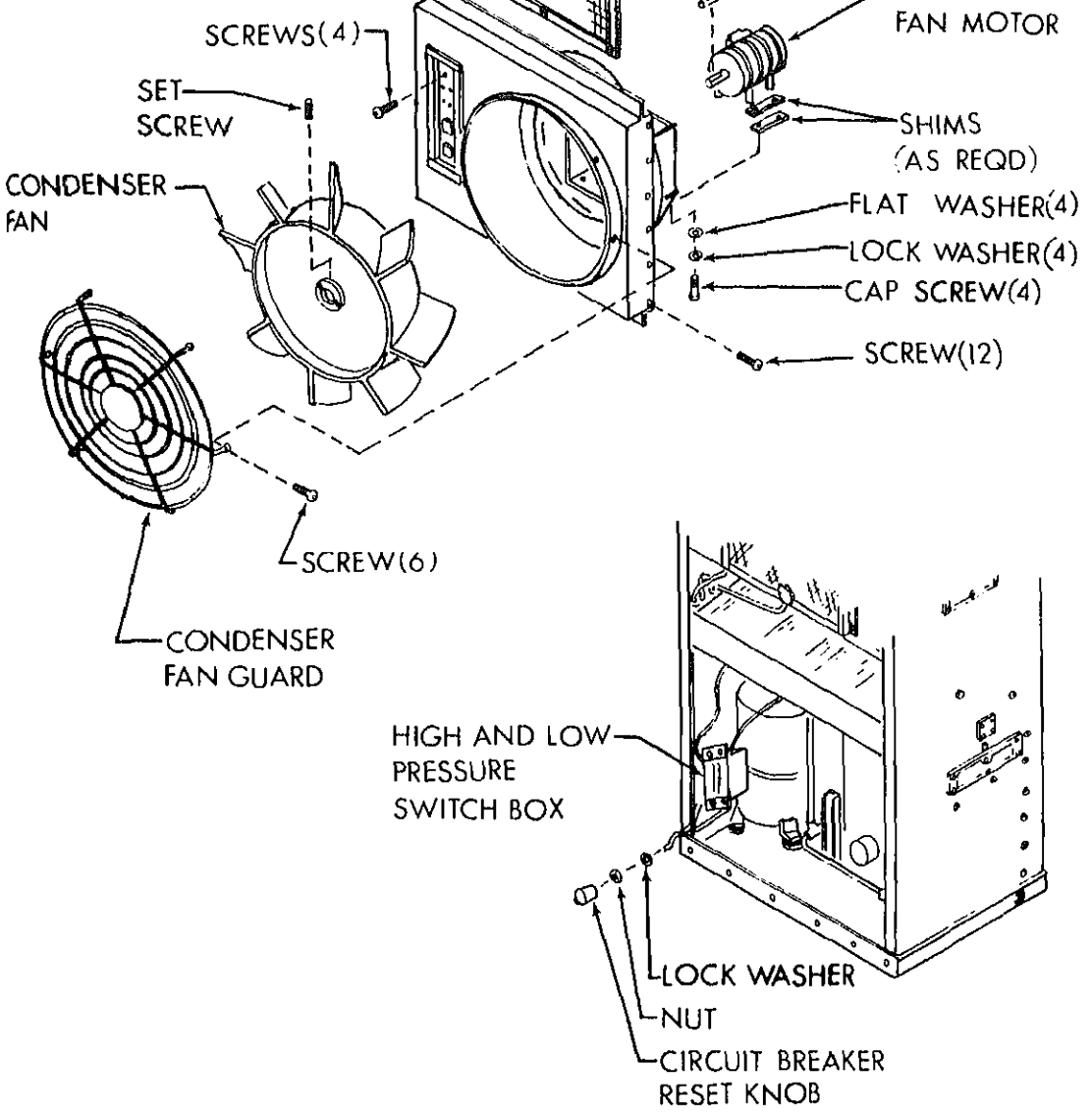

Figure 4-34. Lower Back Panel

(b) Remove the 29 screws and washers that attach the fabric cover to the cabinet.

(c) Slide the fabric cover off the cabinet by alternately pulling or pushing at the corners. If the co or barrier material is stuck to the casing carefully insert the blade of a putty knife, or similar fl ble tool, between the cover and the casing. Be careful to not damage the barrier material.

(6) Remove the 12 mounting screws, flat washers, and lock washers, and remove the condenser int screen.

(7) Pull the circuit breaker remote reset knob all the way out, grip the exposed shaft with a pair of c per-jawed pliers, or a similar tool that will not mar the shaft, and unscrew the knob from the sh Remove the mounting nut and lock washers from the ferrule on the cable assembly, then push cable assembly back inside the lower back panel.

(8) Remove the nut, washer, and ground wire terminal from the frame ground stud.

CAUTION

Be careful to not damage the capillaries to the high and low pressure cut-out switches during the following step and while the switch enclosure is disassembled from the lower back panel.

(9) Remove the four screws that attach the enclosure for the high and low pressure cut-out switche the lower back panel.

WARNING

The lower back panel assembly with the condenser fan and motor installed weighs approximately 40 pounds and is not well balanced. To avoid the possibility of personal injury and/or damage to the equipment, it is suggested that one person hold the assembly while a second person removes the remaining mounting screws in the next step.

(10) Remove the 12 mounting screws that attach the sides of the lower back panel to the side panel the casing, and remove the lower back panel assembly.

c. Disassembly/Inspection. Disassemble the condenser fan and motor from the lower back panel inspect the panel as follows:

(1) Remove the six mounting screws and remove the fan guard.

(2) Loosen the two setscrews and remove the fan and key from the motor shaft.

(3) Remove the four screws, flat washers, and lock washers that attach the motor base to its moun bracket.

(4) Remove the motor and any shims that may have been installed from the mounting bracket. Be sur mark shims so that they can be installed in the same location.

(5) Thoroughly inspect the panel and motor mounting bracket for cracked or broken welds, pop rivets and overall general condition.

and install the four mounting screws, flat washers, and lock washers.

CAUTION

Do not pound the fan onto the motor shaft; motor bearings will be damaged. If difficulties are encountered, dress out rough spots on the shaft or key with a fine file, stone, or abrasive cloth. Sparingly apply a coating of light oil to ease assembly.

2) Install the key in the keyway on the motor shaft, then slip the fan on the shaft and key until the end o the shaft is flush with the surface of the hub on the inside of the fan.

3) Tighten the setscrew over the key finger tight, torque the other setscrew, then torque the setscrew over the key. Torque to 78-82 inch pounds (898-945 meter grams).

4) Carefully check alinement of the impeller; spin the impeller by hand to be sure of clearance from th shroud during rotation.

5) Install the fan guard and the six mounting screws.

nstallation. Install the lower back panel assembly as follows:

1) Lift the panel into position and install the 12 screws which attach the sides of the panel to the sid panels of the casing. (It is recommended that this operation be performed by two persons; one t hold the assembly in position, and the other to install the screws.)

2) Position the high and low pressure switch enclosure on the inside of the panel and install the fou mounting screws. (This operation will require two persons; one to position and hold the enclosur through the lower front panel opening, and the other to install the screws.)

3) Insert the end of the circuit breaker remote reset cable assembly through hole in the panel and in stall the lock washer and mounting nut on the ferrule. Grip the shaft with a pair of copper-jawe pliers, or a similar tool that will not mar the shaft, and screw the knob onto the shaft.

4) Install the washers, ground wire terminal, and nut on the frame ground stud.

5) Install the condenser intake screen and 12 mounting screws, flat washers, and lock washers.

6) Install the fabric cover (fig. 4-11) as follows:

(a) Place the barrier material strip around the top and sides of the cabinet in the same position fro which it was removed. Be sure the holes are alined with the screw holes in the cabinet.

(b) Carefully slide the fabric cover over the casing and barrier material strip. Be sure the stowin straps are hanging down the inside of the roll up flap.

(c) Aline the eyelets in the fabric cover with the holes in the barrier material strip and the screw hole in the cabinet, then install the 23 screws and washers through the top and side eyelets.

(d) Insert and aline the barrier material strip between the bottom of the fabric cover and the cabine base, then install the six screws and washers through the bottom eyelets.

(e) If the air conditioner is to be returned to normal operation, open the snap fasteners, roll up th

(9) Install the lower front panel and tighten the five captive panel fastener screws.

(10) Connect input power at its source.

4-34. EVAPORATOR COIL

See figure 4-35.

a. Access.

(1) Refer to paragraph 4-15.b. and figure 4-12 and remove the top panel and discharge gril

(2) Remove the mist eliminator by lifting it straight up and out of the guides.

b. Inspection of installed items.

(1) Check for accumulated dirt. Clean if an accumulation of dirt is evident.

(2) Check fins for dents, bent edges or any condition that would block or distort air flow. Str damaged fins with a plastic fin comb.

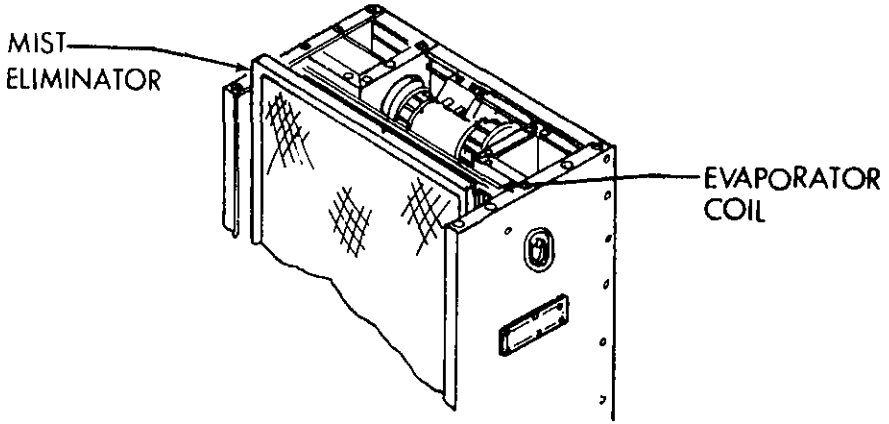

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Figure 4-35. Evaporator Coil

c. Cleaning. Clean coil with a soft bristled brush, vacuum cleaner and brush attachment, o pressed air at 30 psi or less from the inside of the coil to blow the dirt out. Take care to avoid f

d. Repair/Replacement. Should a leak or major damage be evident refer to direct support mai

e. Installation of removed items.

(1) Slide the mist eliminator into place.

(2) Refer to paragraph 4-15.e. and install the top panel and discharge grille.

CONDENSER COIL | See figure 4-36.

ccess.

) Refer to paragraph 4-16.b. and figure 4-13 and remove the lower front panel.

2) Remove the 12 mounting screws, lock washers, and flat washers, then remove the condenser intake screen.

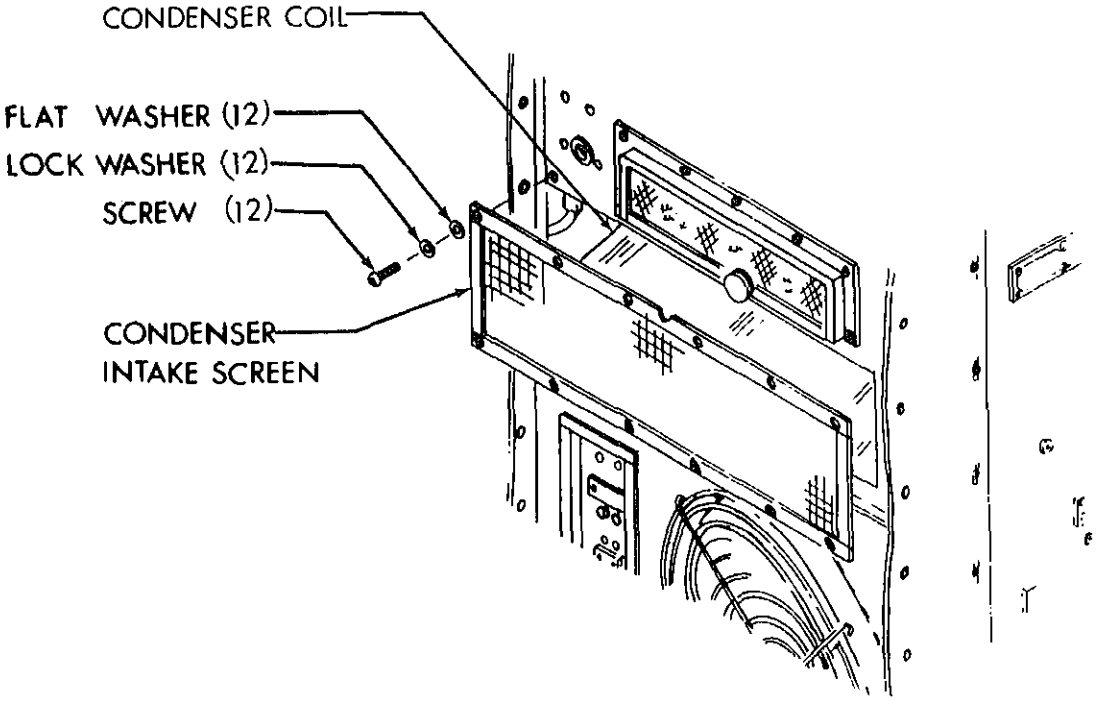

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Figure 4-36. Condenser Coil

nspection of installed items.

1) Check for accumulated dirt. Clean if an accumulation of dirt is evident.

2) Check fins for dents, bent edges or any condition that would block or distort air flow. Straighten a

Align the holes and install the 12 mounting screws, lock washers, and flat washers.

(2) Install the lower front panel as follows:

(a) Set the bottom of the panel in position so that the flange is inside the lip on the cabine

(b) Push the top of the panel back into position and tighten the five captive panel fastener

(c) Connect the input power cable connector, if the front panel location is used.

(d) Reconnect input power at its source.

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Section I

REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

1. GENERAL

a. For authorized common tools and equipment, refer to the Modified Table of Organization and Equipr (MTOE) applicable to your unit.

b. No special tools are required for direct support maintenance of the air conditioner. Test, maintena and diagnostic equipment (TMDE) and support equipment include electrical test equipment, stand pressure and vacuum gages, vacuum pumps and charging manifolds found as standard equipmer any direct support regriferation shop.

c. Repair parts are listed and illustrated in the Repair Parts and Special Tools (RPSTL) list 5-4120-363-24P covering organizational, direct support and general support maintenance for equipment.

2. ASSISTANCE TO ORGANIZATIONAL MAINTENANCE

Maintenance. Direct support maintenance personnel may be requested to assist organizational maintenance personnel in the performance of any of the organizational maintenance procedures covered in Chapter 4.

Troubleshooting. Direct support maintenance personnel may be requested to assist organizational maintenance personnel in troubleshooting to determine the cause of a malfunction or unsatisfactory performance of the air conditioner.

Repair. Direct support maintenance personnel may be requested to assist organizational maintenance in the performance of repair functions normally performed by organizational maintenance personnel. The specific repair functions authorized for performance by direct support maintenance on the Maintenance Allocation Chart (MAC) contained in Appendix D are covered in detail in this Chapter in the order in which they appear on the MAC.

Replacement. Direct support maintenance will condemn items that are beyond authorized repair and will provide appropriate replacement parts or components.

3. AUTHORIZED REPAIR/REPLACEMENT PROCEDURES

General. The following are procedures for the repair/replacement of casing covers, panels, grilles, screens, and information plates as authorized by the MAC. These procedures cover only those actions normally performed by direct support maintenance personnel. It is assumed that, where appropriate, the removal and installation of the item to be repaired or replaced will be performed by organizational maintenance personnel in accordance with procedures in Chapter 4.

Fabric Cover. For removal, cleaning, inspection, lubrication and installation see paragraph 4-14. Minor rips, cuts, tears, or punctures in the fabric cover may be repaired by applying a patch to the inside surface. For damage of greater extent, or missing eyelets or snap fasteners, replace the entire cover.

Top Panel and Lower Front Panel. For removal, cleaning, inspection and installation see paragraph 4-15 for top panel and 4-16 for lower front panel. The only authorized repair for these panels is replacement of gaskets and insulation. Use only the gasket or insulation identified in TM 5-4120-363-24P.

NOTE

An initial supply of adhesive is supplied as Item 2, Section II, Expendable Supplies and Materials List. (See Appendix C.)

(1) Remove as much old gasket or insulation material as possible by pulling or scraping it away from the metal surface.

WARNING

Acetone and methyl-ethyl ketone (MEK) are flammable, and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well-ventilated

air dry until the adhesive is tacky but will not stick to the fingers.

4) Starting with an end, carefully attach the gasket or insulation to the metal. Press into firm contact a over.

5) Should touch up or refinishing be necessary, see TM 43-0139.

6) Replace damaged panels.

Evaporator Intake and Discharge Grilles. For removal, cleaning, inspection, lubrication and installatio see paragraph 4-17. The only authorized repair of the evaporator grilles is the replacement of sealin strips. Use only the gasket material identified in TM 5-4120-363-24P. Replace damaged grilles.

(1) Remove as much old gasket material as possible by pulling or scraping it away from the met surface.

WARNING

Acetone and methyl-ethyl ketone (MEK) are flammable, and their vapors can be explosive. Repeated or prolonged skin contact or inhalation of vapors can be toxic. Use a well-ventilated area, wear gloves, and keep away from sparks or flame.

(2) Soften and remove old adhesive and gasket residue, using acetone or methyl-ethyl ketone (ME and a stiff brush.

(3) Coat the mating surfaces of the metal and the gasket with adhesive. Let both surfaces air dry un the adhesive is tacky but will not stick to the fingers.

(4) Starting with an end, carefully attach the gasket to the metal. Press into firm contact all over.

(5) Should touch up or refinishing be necessary, see TM 43-0139.

Condenser Intake Screen. For removal, cleaning, inspection and installation see paragraph 4-18. The is no authorized repair for this screen. Replace damaged screens.

Information Plates. For locations see paragraph 2-8. All information plates are attached to their mountir surface with blind rivets. To replace, drill out the existing rivets and attach the new plates with new blir rivets.

Section III

FAN AND FAN MOTOR REPAIR PROCEDURES

FANS

moval, cleaning, inspection/testing and installation see paragraph 4-27 for the evaporator fans and 4-3 e condenser fan. There are no authorized repairs for the evaporator and condenser fans. Replac ged fans.

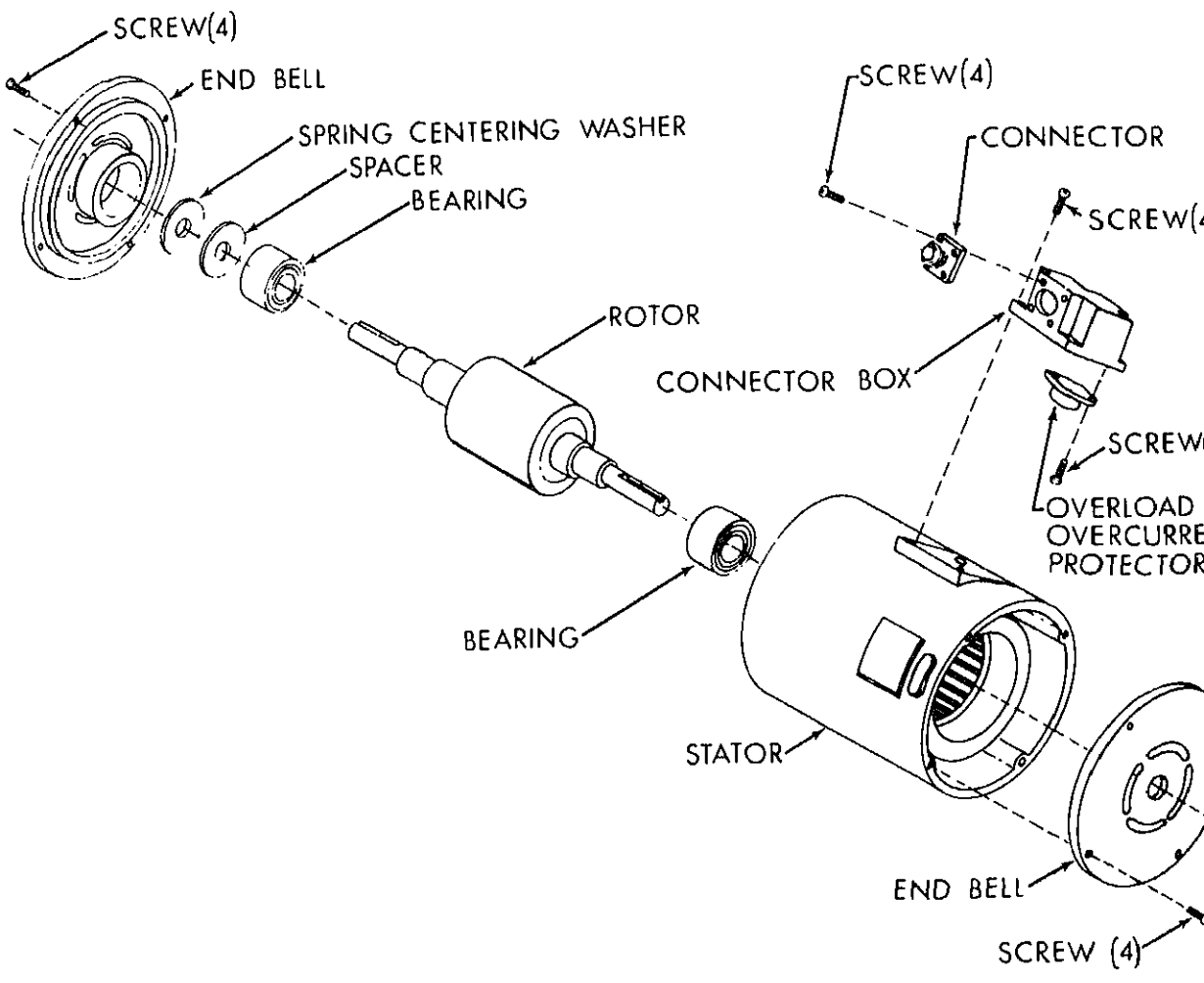


Figure 5-1. Evaporator Fan Motor

For removal, cleaning, inspection/testing and installation see paragraph 4-27.

a. Authorized Repairs. Direct support maintenance repair of the evaporator fan motor is limited t *replacement of the electrical connector, the thermal overload, overcurrent protector, and the bea*

b. Disassembly. Disassemble the motor only as necessary to effect the required repair as follows:

(1) Remove the four attaching screws and pull the connector box away from the frame.

(2) To remove the connector, unsolder the motor leads from the connector pins, remove the four a ing screws, and remove the connector.

(3) To remove the overload, overcurrent protector, unsolder the motor leads from the protector

overcurrent protector by checking for continuity between terminals A and B, A and C, and B and C. If con inuity is not found between any pair of terminals, replace the protector.

WARNING

Dry cleaning solvent (Fed Spec P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

Cleaning/Inspection. Wipe all surfaces of the housing, stator, rotor, and end bells with a cloth dampene with dry cleaning solvent (Fed Spec P-D-680). Inspect all components for signs of damage or unusu wear, paying particular attention to the bearing surfaces on the shaft and the bearing inserts in the en bells. If any bearing surface is scored or excessively worn, replace the entire motor.

Assembly. Assemble the motor as follows:

(1) Install a bearing on each end of the shaft.

(2) Carefully insert the rotor into the stator.

(3) Install the end bell with the clockwise rotational arrow on the end of the shaft and bearing nearest the connector box.

(4) Install the spring centering washer, spacer, and the end bell with the counterclockwise rotational a row on the end of the shaft and bearing away from the connector box.

(5) Position the end bells so that the rotational arrows are at the top, and install the four attachi screws in each bell.

(6) Install the thermal overload, overcurrent protector and the two attaching screws in the connect box, and solder the motor leads to the appropriate terminals on the protector.

(7) Install the connector and four attaching screws in the connector box, and solder the motor leads the appropriate pins in the connector.

(8) Install the connector box and four attaching screws on the motor frame.

CONDENSER FAN MOTOR See figure 5-2.

spection/Testing removal and installation see paragraph 4-32.

Authorized Repairs. Direct support maintenance repair of the condenser fan motor is limited to replac ment of the electrical connector, the thermal overload protector, and the bearings.

Disassembly. Disassemble the motor only as necessary to effect the required repair as follows:

(1) Remove the four attaching screws and pull the connector box away from the motor frame.

(2) To remove the connector, unsolder the motor leads from the pins in the connector, remove the fo attaching screws, and remove the connector.

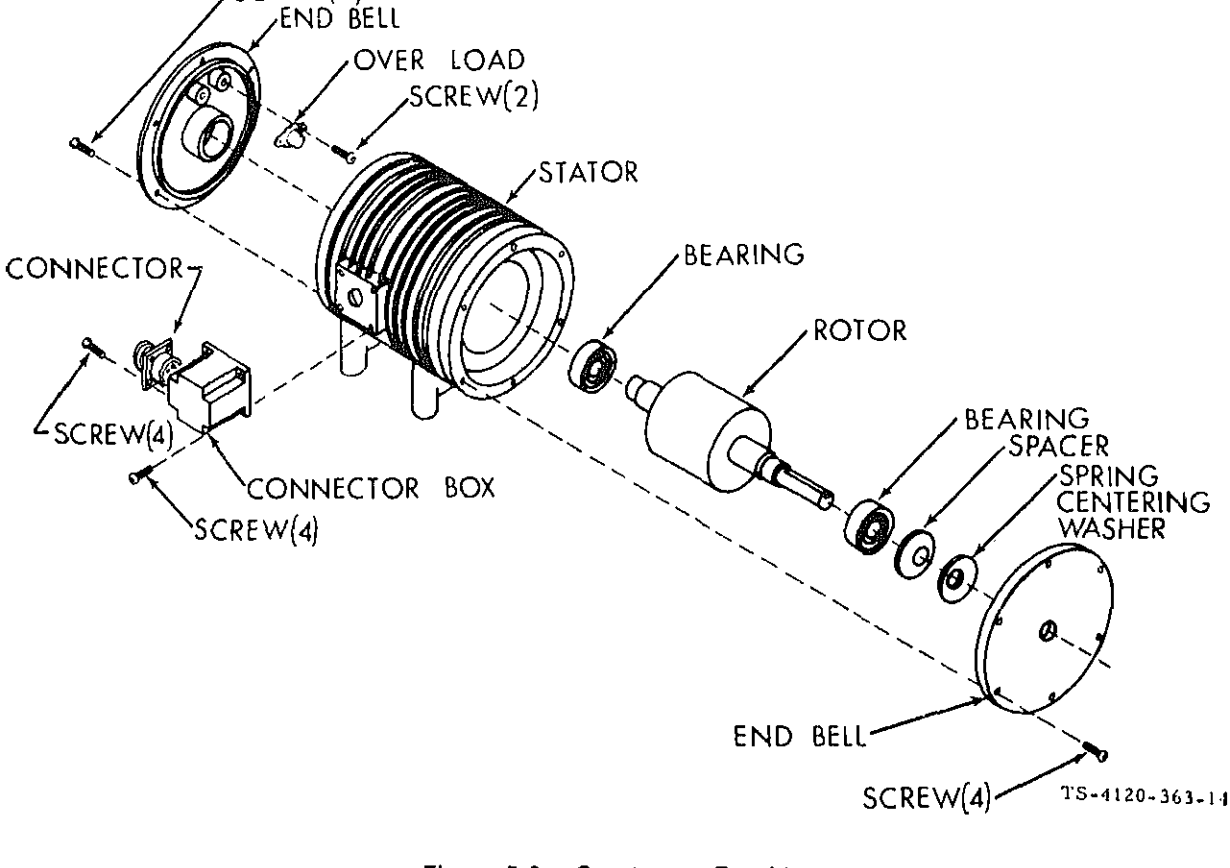


Figure 5-2. Condenser Fan Motor

CAUTION

Use care when performing the next step so as not to damage the motor leads to the thermal overload, overcurrent protector.

(4) Remove the four attaching screws from the end bell on the opposite end of the motor, and remov end bell.

(5) To remove the overload protector, unsolder the motor leads from the terminals on the prote remove the two attaching screws, and remove the protector.

(6) Grasp the shaft and carefully pull the rotor out of the stator.

(7) Remove the spacer, spring centering washer, and bearing from the shaft end of the rotor, remove the bearing from the opposite end.

Dry cleaning solvent (Fed Spec P-D-680) used to clean parts is potentially dangerous to personnel and property. Do not use near open flame or excessive heat. Flash point of solvent is 100°F to 138°F (38°C to 59°C).

Cleaning/Inspection. Wipe all surfaces of the housing/stator, rotor, and end bells with a cloth dampened with dry cleaning solvent (Fed Spec P-D-680). Inspect all components for signs of damage or unusual wear, paying particular attention to the bearing surfaces on the rotor shaft and the bearing inserts in the end bells. If any bearing surface is scored or excessively worn, replace the entire motor.

Assembly. Assemble the motor as follows:

(1) Install a bearing on each end of the rotor shaft, and carefully insert the rotor into the stator with the fan end of the shaft protruding through the end of the housing furthest from the connector box.

(2) Solder the motor leads to the proper terminals on the thermal overload, overcurrent protector, then attach the protector to the blank end bell with the two mounting screws.

(3) Install the blank end bell on the shaft and bearing, position the bell so that the rotational arrow is at the top, and install the four attaching screws.

(4) Install the spacer, spring centering washer, and the other end bell on the shaft and bearing, position the bell so that the rotational arrow is at the top, and install the four attaching screws.

(5) Install the connector and the four attaching screws in the connector box, then solder the motor leads to the proper pins in the connector.

(6) Install the connector box and the four attaching screws on the motor housing.

Section IV

DISCHARGING, PURGING, LEAK TESTING, EVACUATING, AND CHARGING THE REFRIGERATION SYSTEM

. GENERAL

efrigeration system must be totally discharged before any maintenance action is performed on any system component. Leak testing and dehydrator replacement is required after any system component has been removed and replaced. The system must be evacuated before it is charged. The system must be properly charged to function properly.

WARNING

DANGEROUS CHEMICAL
is used in this equipment
DEATH

or serious injury may result if personnel fail to observe proper safety precautions. Great care must be exercised to prevent contact of liquid refrigerant, or refrigerant gas discharged under pressure, with any part of the body. The extremely low temperature resulting from the rapid ex-

contact with the skin or eyes is possible. Application of excessive heat to any component in a charged system will cause extreme pressure that may result in a rupture, possibly explosive in nature. Exposure of Refrigerant-22 to an open flame or a very hot surface will cause a chemical reaction in the gas to form carbonyl chloride (phosgene), a highly toxic and corrosive gas. In its natural state, Refrigerant-22 is a colorless, odorless vapor with no toxic characteristics. It is lighter than air and in a well ventilated area will disperse rapidly. However, in an unventilated area it presents danger as a suffocant.

5-8. DISCHARGING THE SYSTEM

See Figure 5-3.

WARNING

Work in a well ventilated area.

Discharge the refrigeration system as follows:

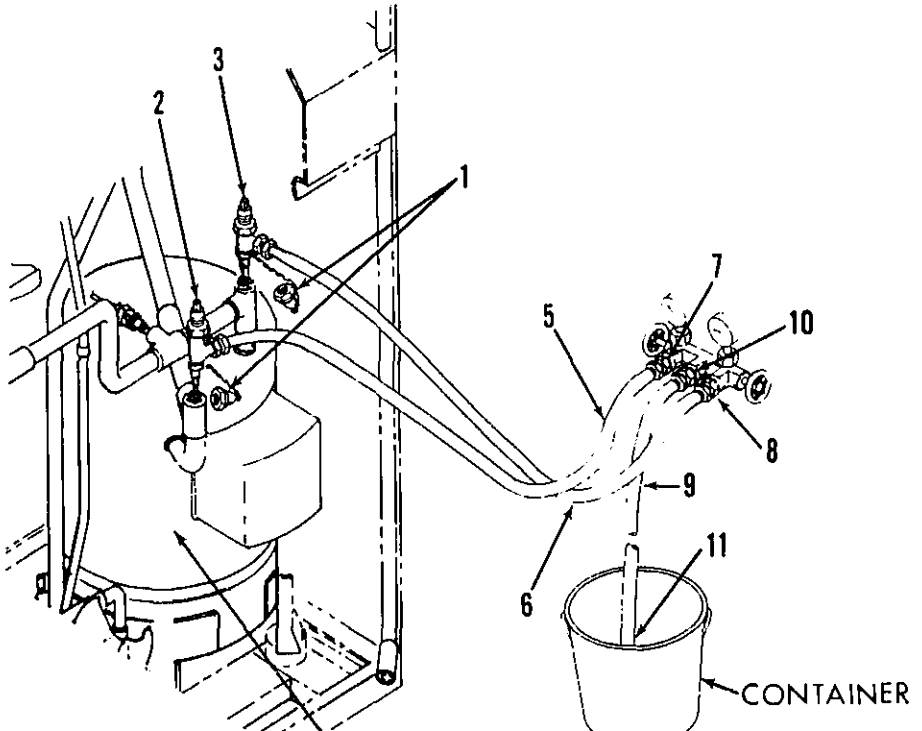
a. Disconnect input power to the air conditioner at its source.

b. Loosen the five panel fastener screws and remove the lower front panel.

c. Remove the caps (1) from the suction service valve (2) and discharge service valve (3) located abo compressor (4).

d. Connect service valves (2 and 3) with hose assemblies (5 and 6) to manifold valves (7 and 8).

e. Attach hose assembly (9) end to manifold center connection (10) and place the other end (11) in tainer located in a well ventilated area, preferably outside. Open manifold valves (7 and 8).



Discharge refrigerant in an open area and *not* around an open flame.

CAUTION

Do not permit the oil to escape from the unit. If oil is escaping, close the valve slightly. Do not permit the refrigerant to escape fast enough to form ice or frost on either the lines or the valve.

Using refrigeration wrench, *slowly* open *LOW SIDE* service valve (2) to allow refrigerant gas to flo *slowly* out hose (11).

Using refrigerant wrench, *slowly* open *HIGH SIDE* service valve (3) to allow refrigerant gas to flow *slow* out hose (11). Check the discharge hose for the presence of oil; adjust valve as necessary.

When gas stops flowing out of hose (11), close both service valves (2 and 3).

PURGING THE SYSTEM

efrigeration system must be purged with dry nitrogen before any brazing is performed on any componer v of dry nitrogen at the rate of 1 - 2 cfm (0.028-0.057 m^3/minute) should be continued during all brazi tions to minimize internal oxidation and scaling.

CAUTION

Nitrogen is an inert gas; however, it also presents danger as a suffocent and, therefore, must also be discharged in a ventilated location.

ming that the system has been discharged sing a manifold as shown in figure 5-3 proceed as follows

Disconnect hose from manifold valve high side (8) and attach to dry nitrogen cylinder valve.

Disconnect hose from manifold valve low side (7).

Disconnect wiring harness connector P5 from connector J5 on pressure equalizer (bypass) solenc valve K4.

Using jumper wires and an external power source, apply 24 volts dc between pins A and B in connec J5.

NOTE

It is essential that normally open solenoid valve K4 be closed in order to purge the system. Otherwise, the nitrogen will flow from the discharge service valve through K4 to the suction service valve without purging the rest of the components.

Open both service valves (2 and 3 on figure 5-3.)

Open the nitrogen cylinder valve and allow the nitrogen to sweep through the system. Check the d charge hose to be sure oil is not being forced out of the system.

h. After installation brazing operations are completed, allow nitrogen to flow for a minimum of 5 minute

i. Close cylinder valve.

j. Close both service valves.

k. Remove the jumper wires from connector J5 and connect connector P5 to connector J5.

l. Disconnect all hoses.

5-10. LEAK TESTING

See figure 5-4.

he entire refrigeration system should be thoroughly leak tested after repair or replacement of any compone efore it is recharged with Refrigerant-22. Leak testing is also the method for troubleshooting when a syst as lost all or part of its refrigerant charge through an undetermined cause.

a. Disassembly. Considerable disassembly of the air conditioner is necessary to gain access to all t refrigeration system components that must be leak tested. Perform the following disassembly in acco ance with the detailed procedures in the referenced paragraphs in Chapter 4:

NOTE

The following steps cover all the disassembly actions necessary to prepare a system for complete leak testing. If the air conditioner has been partially disassembled for repair, some of these actions will already have been accomplished.

(1) Disconnect input power at its source.

(2) Remove evaporator intake and discharge grilles (para 4-17).

(3) Remove lower front panel (para 4-16).

(4) Remove top panel (para 4-15).

(5) Remove condenser intake screen (para 4-18).

(6) Remove fresh air filter (para 4-19).

(7) Remove conditioned air filter (para 4-20).

(8) Remove mist eliminator (para 4-22).

b. Testing Method. There are two acceptable methods for leak testing the refrigeration system.

(1) Refrigerant Gas Leak Detector. If an electronic refrigerant gas leak detector is available it should used in accordance with the procedures contained in TM 9-4940-435-14, "Leak Detector, Refriger Gas."

NOTE

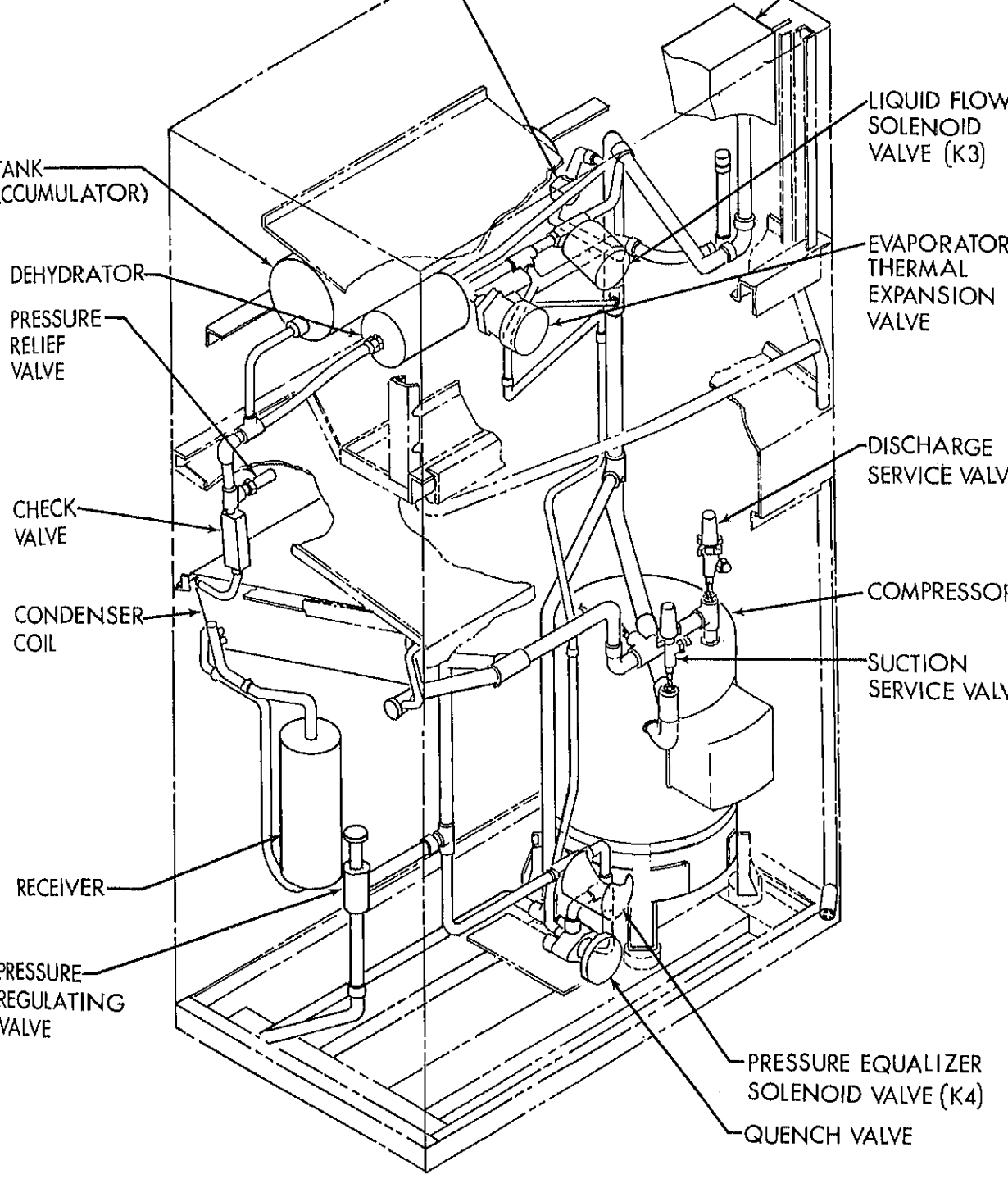


Figure 5-4. Refrigeration System Component Location

(2) Soap Solutions. In this method, a strong solution of a liquid detergent and water is brushed onto a points of possible leakage while closely observing for the formation of bubbles.

CAUTION

If the soap solution testing method is used, thoroughly rinse with fresh water after testing is completed. A residual soap film will attract and accumulate an excessive amount of dust and dirt during operation.

c. Testing Procedures. To perform leak testing by use of the electronic detector, it is necessary that th system be pressurized with a proportion of refrigerant gas. To perform leak testing by use of the soa solution method, the system may be pressurized with dry nitrogen alone.

(1) To pressurize a system that has some refrigerant charge, for either leak testing method:

(a) Connect a pressure gage to the suction service valve.

CAUTION

Nitrogen cylinders are pressurized containers. The pressure in the cylinder can exceed 2000 psi. A nitrogen pressure regulator should be used at all times when nitrogen is used for leak check or purge operations.

(b) Connect a cylinder of dry nitrogen to the discharge service valve.

(c) Open both service valves, then open the nitrogen bottle valve and allow system pressur to bui up till gage reads 350 psi (24.7 kg/cm^2).

(d) Perform leak tests, then discharge and purge the system in accordance with paragraphs 5-8 ar 5-9 before performing maintenance, or evacuating and charging the system, as appropriate.

(2) To pressurize a system that has been discharged and purged, for leak testing with an electron detector:

(a) Connect a pressure gage to the suction service valve.

(b) Connect a drum of Refrigerant-22 to the discharge service valve.

CAUTION

If the refrigerant drum has a selector valve that allows either vapor or liquid refrigerant to be dispensed, be sure it is in the vapor position. When dispensing refrigerant vapor always do so at a slow enough rate so that frost does not form on the drum or on components of the servicing fixture.

(c) Open both service valves.

(g) Connect a cylinder of dry nitrogen to th discharge valve.

(h) Open the discharge service valve and the nitrogen cylinder valve; allow system pressure to b up until both fixture gages read 350 psi (24.7 kg/cm²).

(i) Perform leak tests, then discharge and purge the system in accordance with paragraph 5-8 5-9 before performing maintenance, or before evacuating and charging the system. appropriate.

(3) Final Leak Testing. Always perform a final leak test after performing any repair or replaceme components before the air conditioner is reassembled and the refrigeration system is evacuated charged.

d. Reassembly. Since evacuation and charging of the system is normally performed as a continuous op tion, it is advisable to reassemble the air conditioner after final, satisfactory leak testing. Reassembl the components removed to gain access to the refrigeration system, except for the lower front pane follows:

(1) Install mist eliminator (para 4-22).

(2) Install conditioned air filter (para 4-20).

(3) Install fresh air filter (para 4-19).

(4) Install condenser intake screen (para 4-18).

(5) Install top panel (para 4-15).

(6) Install evaporator intake and discharge grilles (para 4-17).

5-11. EVACUATING THE SYSTEM

See figure 5-5.

he refrigeration system must be evacuated to remove all moisture before it is charged with Refrigeran

a. Check that system was leak tested and has NO LEAKS.

b. Check that new filter-dryer was installed. If not, install one.

c. Check that both service valves (1 and 2) and manifold valves (3 and 4) are closed.

d. Attach hose assemblies (5 and 6) to service valves (1 and 2) and manifold valves (3 and 4).

e. Attach hose assembly (7) to vacuum pump (8) and manifold center connection (9).

f. Start vacuum pump.

g. Open manifold valves (3 and 4).

h. Open both service valves (1 and 2).

i. Run the vacuum pump until at least 29 inches of mercury, measured on the gage, is reached.

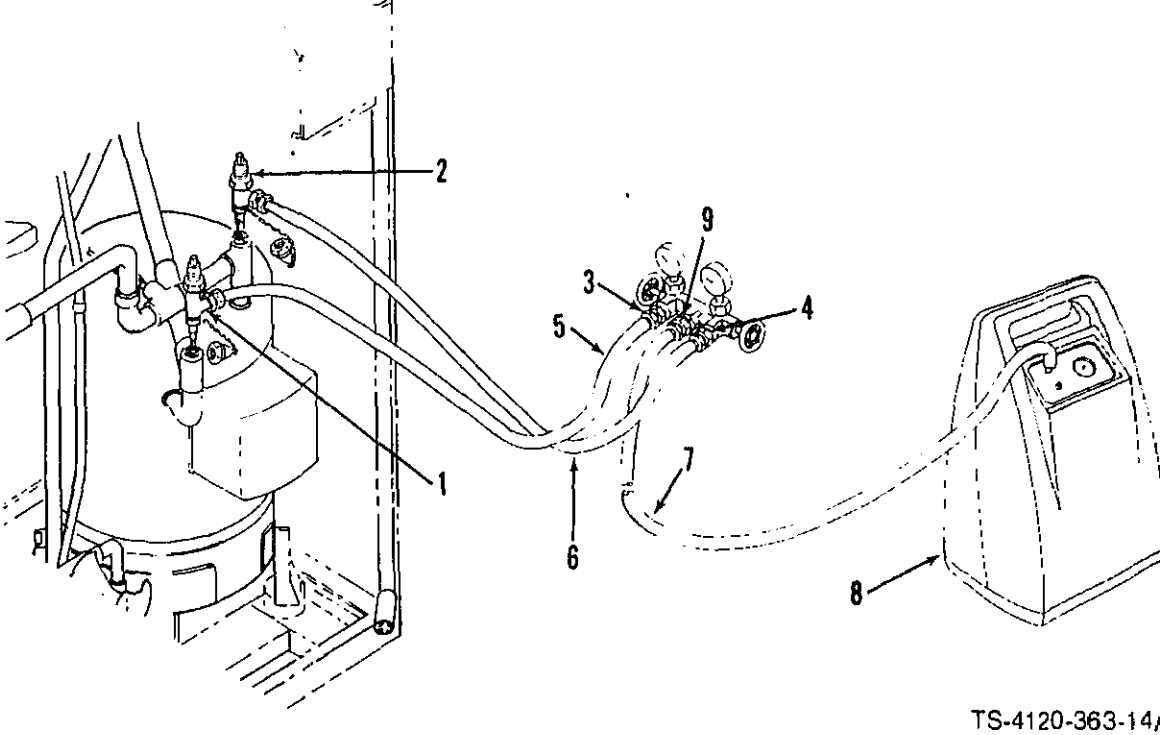


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Figure 5-5. Evacuating the System

NOTE

Inability to reach 29 inches of mercury may indicate either a leak *or* a problem with the pump.

j. Continue running the pump for one more hour, while observing the gage. If the gage needle move and forth, you have a leak which must be located and corrected first.

k. Close manifold valves (3 and 4).

l. Close both service valves (1 and 2).

m. Stop vacuum pump.

n. Close suction and discharge valves and disconnect hoses.

5-12. CHARGING THE SYSTEM

After the system has been satisfactorily evacuated, it must be fully charged with Refrigerant-22.

CAUTION

Never introduce liquid refrigerant into the suction service valve.

(1) Remove the circuit breaker access panel from the lower front panel.

(2) Run the hoses through the circuit breaker access hole and connect them to the suction and discharge service valves. This should be done with the lower front panel loose from the unit at this point to ease later steps.

Invert refrigerant tank or if refrigerant drum has a selector valve that allows either vapor or liquid to be dispensed, be sure it is in the liquid position. Open refrigerant tank valve slightly and loosen hose fittings for a few seconds to purge lines. Then tighten fitting at hoses.

Using scales, measure and record weight of tank with liquid refrigerant.

Open refrigerant drum valve fully. Open unit service valves and discharge manifold valve. Do not open suction manifold valve. Allow liquid refrigerant to enter system until drum weight has decreased by 14.2 pounds (6.4 Kg) or system pressures equalize. Close refrigerant drum valve. Close discharge manifold valve.

Reset the low pressure cutout switch.

NOTE

If 14.2 lb (6.4Kg) charge has been obtained, perform steps h, i, j and m only. If 14.2 lb (6.4Kg) charge has not been obtained continue with all of following steps.

Return refrigerant drum to the upright position or if drum has a liquid/vapor selector valve, be sure it is in the vapor position. Open the refrigerant drum valve and open the suction manifold valve. Do not open the discharge manifold valve.

Install the lower front panel and tighten the five fastener screws.

NOTE

The reason for installing the lower front panel is so that the condenser fan will draw air through the condenser coil when the air conditioner is started in the COOL mode to continue charging.

Connect input power to the air conditioner at its source.

Turn the temperature control knob fully to DECREASE (counterclockwise), then place the mode selector switch in the COOL position.

Monitor the weight of the refrigerant drum as the compressor pulls additional refrigerant vapor into system until the drum weight has decreased by 14.2 pounds (6.4Kg).

When the system is fully charged, immediately close the refrigerant drum valve.

Run the air conditioner in COOL mode (with temperature control in coolest position) for 15 minutes.

CAUTION

Do not skip the next step.

- *Milky white or bubbly* liquid means the system has a low charge.
- *Clear bubble-free* liquid around the center means the system is fully charged.

o. If charge is *low* add *gas* refrigerant.

(1) Open the drum valve.

(2) Continue to charge until sight glass is clear and bubble-free.

(3) Close the refrigerant drum valve.

p. Turn the mode selector switch to OFF, loosen the five panel fastener screws and remove t panel.

q. Fully close the discharge and suction service valves, then remove the fixture hose fittings fr and pull the hoses out through the circuit breaker access opening in the lower front pan

r. Install the circuit breaker access cover on the panel and tighten its four panel fastener install the lower front panel and tighten its five panel fastener screws.

Section V

REFRIGERATION SYSTEM TROUBLESHOOTING

5-13. GENERAL

The two most likely malfunction symptoms to be reported to direct support maintenance are: (1) color or bubbles observed in the sight glass; and (2) reduced cooling capacity. Discussion and/or organizational maintenance personnel as to how the symptoms appeared can often be mo than the symptoms themselves.

a. Sight Glass Indications. There are two indications that may be observed in the sight gla result of moisture content in the refrigerant, and vapor bubbles in the liquid refrigerant.

(1) Color Change. A bright green color indicates that the refrigerant is dry. As moistu creases, the color will fade through chartreuse hues until it reaches a pure yellow. A g from green into chartreuse over an extended period of time is normally an indic dehydrator is becoming saturated with moisture. A sudden change of color is highly u a rupture occurs allowing all refrigerant to escape.

(2) Bubbles. The appearance of an occasional bubble in the sight glass can be expect when operating in a high ambient temperature. A gradual increase in the number o bubbles is usually an indication that the refrigerant charge is being lost from the sys small leak. The number and frequency of bubbles will also increase if the refrige becomes overheated. The sudden appearance of numerous bubbles is usually an i serious leak.

b. Reduction in Cooling Capacity. A reduction in cooling capacity will occur as a natural resu

-14. OVERHEATING CHECKS

erheating of the refrigeration system is often the cause of bubbles appearing in the sight glass, or a red
n in cooling capacity. Adequate cooling of the hot, compressed refrigerant vapor in the condenser is ess
to the proper operation of the air conditioner. The following checks should be made to ensure that overhe
is not the cause of the symptoms before troubleshooting the pressurized portion of the refrigeration syste

a. Be sure there is no external obstruction to the air flow into the condenser intake screen and out of
condenser fan guard.

b. Be sure there is no obstruction within the intake screen and fan guard.

c. Be sure there are no obstructions or an excessive build-up of dust and dirt in the condenser coil.

d. Be sure the condenser fan and fan motor are in good condition and are functioning properly.

-15. REFRIGERANT PRESSURE CHECK

cept in cases where it is obvious that the refrigerant charge has been lost, the first step in troubleshoot
blems in the refrigeration system should be to check discharge and suction pressures under operat
nditions. Check pressures as follows:

a. Turn the mode selector switch to OFF, then loosen the five panel fastener screws and remove the lo
front panel.

b. Loosen the four panel fastener screws and remove the circuit breaker access panel from the lower fr
panel.

c. Feed hoses through the circuit breaker access hole and connect the host fittings to the discharge
suction service valves.

d. Connect individual pressure gages or a refrigeration servicing manifold to the hoses.

e. Open the suction and discharge service valves.

f. Both gages should read the same. Check the reading with the appropriate column in Table 5-1. If
system is even partially charged, the pressure should be approximately equal to that shown in the ta
for the appropriate ambient temperature. If the pressure is considerably less than shown in the table,
system does not contain enough refrigerant to continue the pressure check; proceed directly to l
testing.

g. Install the lower front panel and tighten the five panel fastener screws, then turn the temperature con
knob to fully DECREASE (counterclockwise) and place the mode selector switch to COOL.

h. Allow the compressor to run for a few minutes, then check pressure gages and compare readings.

(1) If discharge and suction pressures are at, or near, the same value, a pressure equalizer solen
valve (K4) malfunction, or an internal compressor failure is indicated.

(2) If discharge pressure is low and suction pressure is normal, a low refrigerant charge is indica

(3) If discharge pressure is normal and suction pressure is either high or low, failure or maladjustm

Deg F	Deg C	Psig	kg/em²	Deg F	Deg C	Psig	kg/em²
10	-12.3	32.93	2.315	66	18.9	114.2	8.029
12	-11.1	34.68	2.439	68	20.0	118.3	8.318
14	-10.0	36.89	2.593				
16	- 8.9	38.96	2.739	70	21.1	122.5	8.612
18	- 7.8	41.09	2.889	72	22.2	126.8	8.915
				74	23.3	131.2	9.225
20	- 6.6	43.28	3.043	76	24.4	135.7	9.541
22	- 5.5	45.23	3.180	78	25.6	140.3	9.864
24	- 4.3	47.85	3.364				
26	- 3.4	50.24	3.532	80	26.7	145.0	10.195
28	- 2.2	52.70	3.705	82	27.8	149.8	10.522
				84	28.9	154.7	10.877
30	- 1.1	55.23	3.883	86	30.0	159.8	11.236
32		57.83	4.066	88	31.1	164.9	11.594
34	1.1	60.51	4.254				
36	2.2	63.27	4.448	90	32.2	170.1	11.960
38	3.3	66.11	4.648	92	33.3	175.4	12.332
				94	34.5	180.9	12.719
40	4.4	69.02	4.853	96	35.6	186.5	13.113
42	5.5	71.99	5.062	98	36.7	192.1	13.506
44	6.6	75.04	5.276				
46	7.7	78.18	5.497	100	37.8	197.9	13.914
48	8.8	81.40	5.723	102	38.9	203.8	14.329
				104	40.0	209.9	14.758
50	10.0	84.70	5.955	106	41.1	216.0	15.187
52	11.1	88.10	6.257	108	42.2	222.3	15.630
54	12.2	91.5	6.433				
56	13.3	95.1	6.686	110	43.3	228.7	16.080
58	14.5	98.8	6,947	112	44.4	235.2	16.537
				114	45.6	241.9	17.008
60	15.6	102.5	7.206	116	46.7	248.7	17.486
62	16.7	106.3	7.474	118	47.8	255.6	17.971
64	17.8	110.2	7.748				

(4) If both discharge and suction pressures are normal, but ice forms on the evaporator co evaporator coil does not cool, during operation, failure or malfunction of evaporator expansi (V5) is indicated.

(5) If discharge pressure is high and suction pressure is normal, a malfunction of quench valv indicated.

i. When pressure tests are completed, proceed with the maintenance action indicated.

i-16. LEAK TESTING

eak testing in accordance with paragraph 5-10 is the troubleshooting method that is used to isolate ne refrigeration system. Thorough leak tests must be performed after any maintenance action in w pressure component in the refrigeration system has been replaced that involved brazed joints. Limited of the flare fittings should be performed after replacement of the dehydrator, or either of the pressu switches.

ich the pressure regulating valve, the pressure relief valve, and the capillaries to the high and low press
tout switches connect, and the connection of the external equalizer tube to the evaporator expansion va
e brazed at assembly. Flare fittings are provided on the dehydrator because it must be replaced each time
rigeration pressure system is opened for any reason. Flare fittings are used on the adapters and the exte
ualizer tube to avoid possible damage to the valves or capillaries that might be caused by the hea
azing.

3-18. BRAZING PROCEDURES

a. General. All tubing in the refrigeration system is seamless copper with a bright internal finish that perm thorough cleaning and prevents entrapment of moisture or other impurities. Rigid grade copper is u for straight sections and soft grade for sections that must be bent. All interconnecting fittings, such elbows, tees, etc., are also copper. The bodies of all valves and all connectors on other components brass. All joints, except those provided with flare fittings, are made by brazing in accordance with M B-7883, except that radiographic examination is not required.

b. Filler Alloy. Grade IV or VI brazing alloy and Type B flux, as specified in MIL-B-7883, must be used fo copper to brass joints. Grade III brazing alloy may be substituted for Grade IV or VI for copper to cop joints; flux is not required for copper to copper joints.

c. Debrazing. Debraze joints for removal of refrigeration system components as follows:

WARNING

All Refrigerant-22 must be discharged from the system and the entire system must be purged with dry nitrogen before beginning any debrazing operation.

(1) Determine which joints are to be debrazed. Due to the limited work space inside the air conditione may be more convenient to remove a part of the interconnecting tubing with the component ra than debrazing the joints on the component itself.

(2) Before debrazing a joint on a valve, disassemble the valve to the extent possible, then wrap all the joint with a wet cloth to act as a heat sink.

WARNING

The polyurethane foam used as insulation in the air conditioner will break down to form toxic gases if exposed to the flame of a torch or brazing temperature.

(3) Protect insulation, wiring harnesses, and other surrounding components with appropriate shie

(5) Apply sufficient heat uniformly around the joint to quickly melt the filler alloy. If heat is ap slowly, or only on one side, the entire component or length of tubing will be heated and filler all adjacent joints may also be melted. Remove heat as soon as the joint separates.

d. Cleaning Debrazed Joints. All filler alloy must be cleaned from debrazed joints before reassembly. each piece of the joint until the filler alloy is melted and then wipe it away with a fiber-glass cloth. Be no filler alloy or other debris is left inside any tubing, fitting, or component.

e. Reassembly. If tubing sections or fittings were removed with a component, debraze them from the cor nent, clean the joints, and braze them to the new component before reinstallation.

f. Brazing. Braze joints within the air conditioner as follows:

(1) Position the component to be installed.

(2) To prepare for brazing a joint on a valve, disassemble the valve to the extent possible, then wra but the joint with a wet cloth to act as a heat sink.

(3) Protect insulation, wiring harnesses, and surrounding components with appropriate shields.

(4) Be sure the work area is well ventilated and that dry nitrogen is flowing through the refrigera system at a rate of 1 - 2 cfm (0.028)-0.057 m^3/minute).

(5) Apply sufficient heat uniformly around the joint to quickly raise it to a temperature that will mel filler alloy. Remove heat as soon as brazing is completed.

5-19. EVAPORATOR COIL

See figure 5-6.

The evaporator coil serves as an expansion chamber in which liquid refrigerant metered through the eva or thermal expansion valve rapidly expands into a very cold vapor. The cold vapor then absorbs heat fror air passing over the outside surfaces of the evaporator coil.

a. Access. The evaporator coil is located in the top front section of the cabinet directly behind the eva tor discharge grille and mist eliminator. See paragraph 4-34 for general access, inspection and clea

b. Removal.

(1) See paragraph 4-20 and remove the damper knob, intake grille and conditioned air filter.

(2) Drill out the two blind rivets in the right side panel of the casing and the rivet through the c panel of the casing that attach the block-off around the pressure and suction tubing to the eva tor coil, and remove the block-off.

(3) Unwrap the insulation from the evaporator coil suction return line as necessary to expose join debrazing.

CAUTION

Be sure the refrigeration system is fully discharged and purged and that dry nitrogen is flowing through the system at the rate of 1 - 2 cfm (0.028-0.057 m^3/minute) before debrazing.

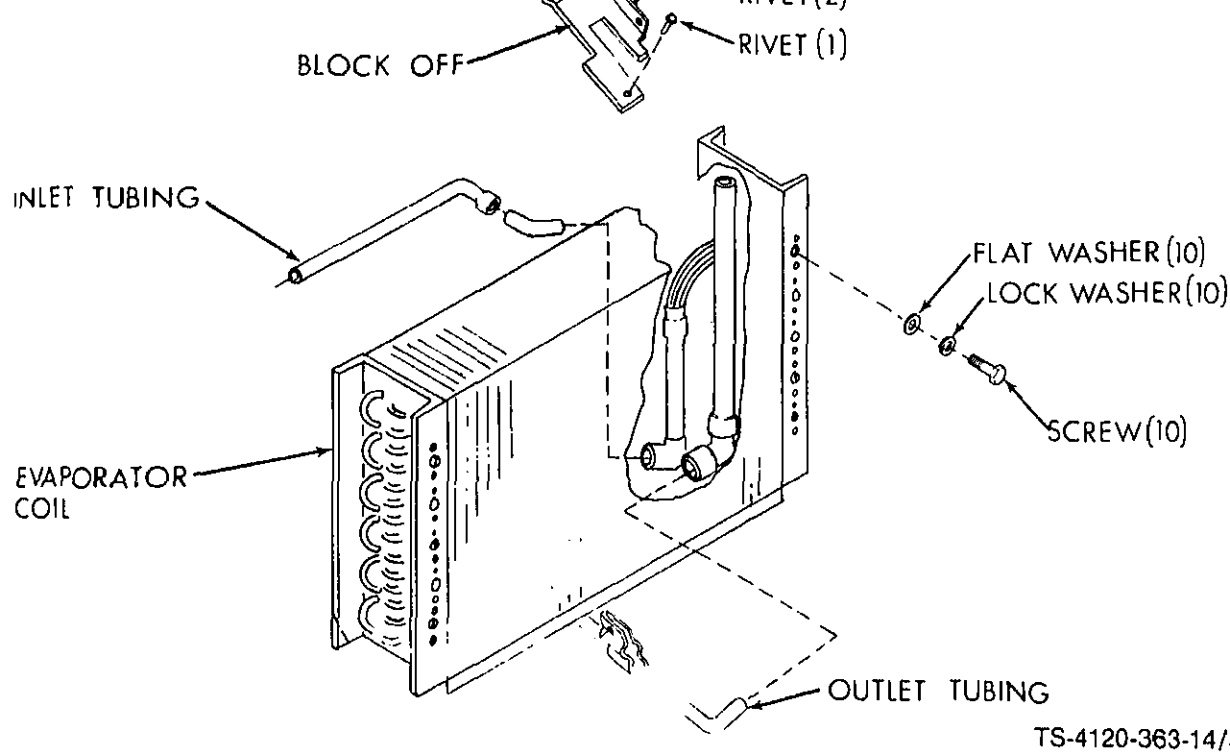


Figure 5-6. Evaporator Coil

(5) Remove the five screws, flat washers, and lock washers that mount each side of the evaporato to the mist eliminator channel brackets.

(6) Lift the evaporator coil straight up out of the top panel opening.

c. Installation. Install the evaporator coil as follows:

(1) Lower the evaporator coil straight down through the top panel opening.

(2) Aline the evaporator coil with the mist eliminator channel bracket, and install the five mou screws, flat washers, and lock washers on each side.

CAUTION

Be sure dry nitrogen is flowing through the refrigeration system at the rate of 1 - 2 cfm (0.028-0.057 m^3/minute) before brazing.

(3) Braze the pressure and suction tubing to the elbows at the bottom end of the evaporator coil and outlet tubing.

CAUTION

(7) Install the block-off around the pressure and suction tubing to the evaporator coil an blind rivets to attach it to the right side panel and the top panel of the casing.

(8) Install the mist eliminator filter element.

(9) Refer to paragraph 4-15.e. and figure 4-12 and install the top panel.

(10) Install the conditioned air filter element, the filter retaining bracket, and the five atta and washers.

(11) Install the evaporator intake grille and the 12 attaching screws and washers.

(12) Install the front fresh air damper control knob, aline the setscrew with the flat on tighten the setscrew.

d. Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5

5-20. EVAPORATOR THERMAL EXPANSION VALVE

See figure 5-7.

The evaporator thermal expansion valve meters liquid refrigerant into the inlet pressure tube to t coil. The rate of refrigerant flow through the valve is controlled by a temperature sensing bulb a valve through a capillary. The sensing bulb is mounted on the suction return line at the outlet of t coil. Pressure drop across the evaporator coil is compensated for by an external equalizer lin suction line to the compressor and power assembly of the valve.

NOTE

Thermal expansion valves operate on a principal of "superheat." The refrigerant "superheated" whenever its temperature is higher than the temperature correspondin pressure at saturation. (See Table 5-1 for pressure-temperature relationship of Refrigera at saturation.) For example: Refrigerant - 22 under 69 psi (4.85 kg/cm²) is saturated a (4.4°C). Therefore, if the vapor in the suction line is under 69 psi (4.85 kg/cm²) pressu temperature of 50°F (10.0°C), the superheat factor is 10°F (5.55°C).

a. Access. The evaporator thermal expansion valve is located in the evaporator intake sec conditioned air filter. To gain access to the valve:

(1) Loosen the setscrew and remove the front fresh air damper control knob.

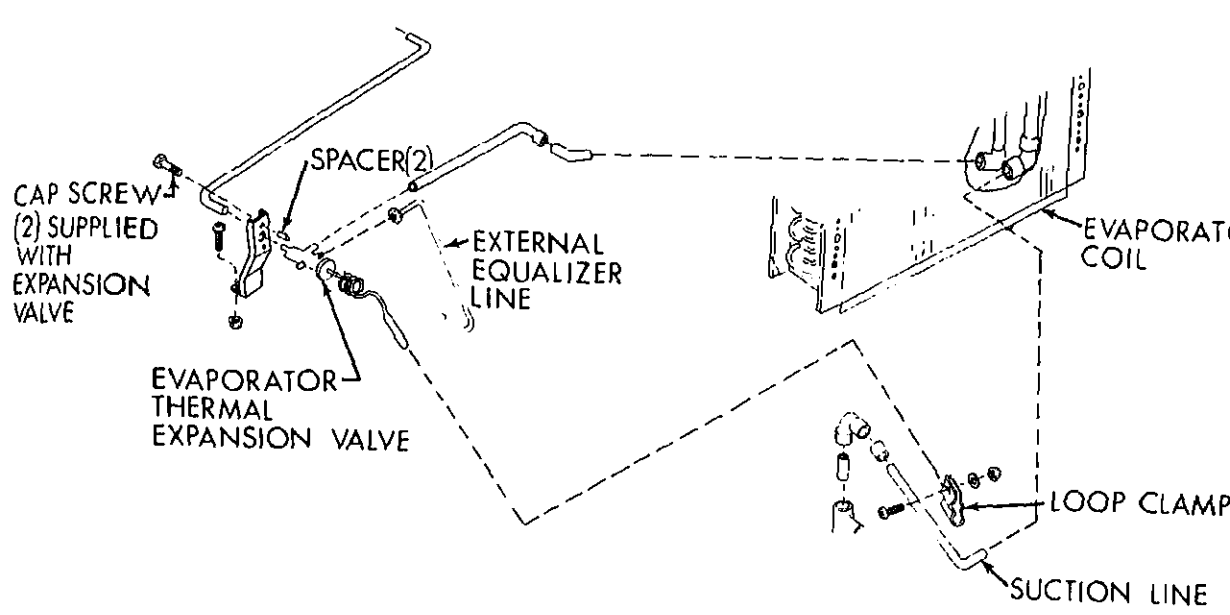
(2) Remove the 12 attaching screws and washers, and remove the evaporator intake gr

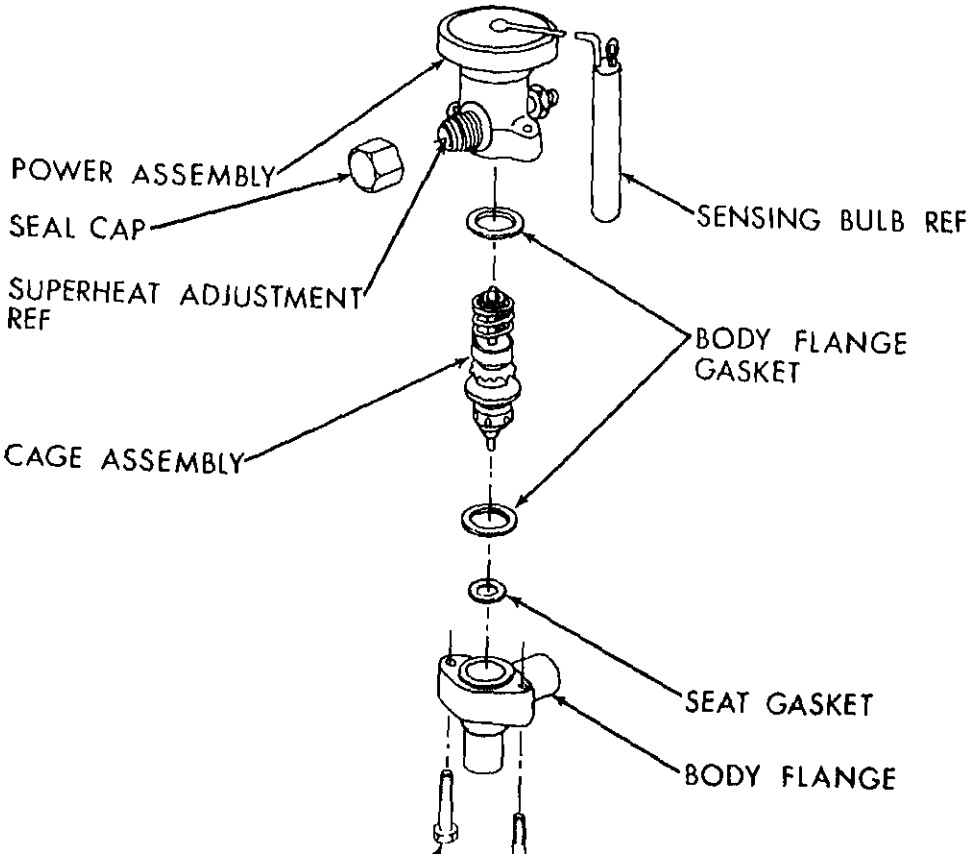
(3) Remove the five attaching screws and washers, and remove the filter retaining br conditioned air filter element.

b. Testing and Superheat Adjustment. Test and adjust the valve for the desired superheat a

(1) With the air conditioner turned OFF, loosen the five panel fastener screws, and ren front panel, then loosen the four panel fastener screws, and remove the circuit breake from the center of the lower front panel.

(2) Insert a refrigerant hose through the circuit breaker access opening and connect t


CAP SCREW (2) SUPPLIED WITH EXPANSION VALVE
SPACER(2)
EXTERNAL EQUALIZER LINE
EVAPORATOR THERMAL EXPANSION VALVE
EVAPORATOR COIL
LOOP CLAMP
SUCTION LINE


POWER ASSEMBLY
SEAL CAP
SUPERHEAT ADJUSTMENT REF
SENSING BULB REF
BODY FLANGE GASKET
CAGE ASSEMBLY
SEAT GASKET
BODY FLANGE

NOTE

The static pressure in the refrigeration system when the air conditioner is OFF is the pressu temperature relationship at the given temperature of the refrigerant as shown in Table 5-1. example: At an ambient temperature of 80°F (26.7°C) the static pressure should be appr imately 145 psi (10.2 kg/cm²).

(5) Install the lower front panel and tighten the five panel fastener screws.

(6) Unwrap the insulation from the evaporator coil suction return line so that evaporator valve sensing bulb is exposed, then loosen the screw and nut in the loop clamp that a sensing bulb to the suction line, and pull the bulb out of the clamp. Take care to note t (center top of suction line) of the bulb.

CAUTION

Use care to not damage or kink the capillary.

(7) Place the sensing bulb in a container of ice water or crushed ice so that it is re temperature near 32°F (0°C).

(8) Set the temperature thermostat control knob fully DECREASE (counterclockwise), plac on the exposed suction return line, and start the air conditioner in COOL mode. I temperature is felt on the suction return line, the expansion valve is not closing fully an replaced. If the return line temperature remains constant, check the pressure gage; it s cate approximately 58 ± 2 psi (4.0 ± 0.14 kg/cm²). If the pressure is not within the abov the operation of the quench valve (para 5-20) and the pressure regulation valve (para 5 attempting adjustment of the evaporator expansion valve.

CAUTION

When performing the next test, turn the air conditioner to OFF as soon as a definite dro temperature is felt on the suction return line. If the test conditions are continued more tha few seconds, the expansion valve will fully open and an excessive flood-back of li refrigerant may damage or destroy the compressor.

(9) With one hand still on the suction return line, remove the sensing bulb from the containe it in the other palm. If a temperature drop is not felt in the suction return line by the time bulb no longer feels cold to the hand, the expansion valve is not opening and should be r soon as a temperature drop is felt, turn the air conditioner to OFF.

NOTE

The optimum superheat setting for the evaporator expansion valve is 10°F (5.55°C) above saturation temperature of the refrigerant at operating suction line pressure. This setting provide maximum efficiency of the evaporator coil.

(10) Slip the sensing bulb into its mounting loop clamp. Be sure the bulb is centered on the to

(12) Rewrap insulation on the suction return line, being sure to cover the sensing bulb.

(13) Start the air conditioner in the COOL mode with the tmermostat fully DECREASE (counterclockwise and allow it to run about 30 minutes, then check to be sure the temperature in the suction line ha stabilized and the thermometer reading remains unchanged for at least 2 minutes.

(14) Note the pressure on the gage connected to the suction service valve, find the saturatio temperature for the pressure gage reading in Table 5-1, and compare with the thermometer reading The thermometer temperature should be 10 ± 1°F (5.55 ± 0.55°C) higher than the saturatio temperature found on the chart.

(15) If the superheat setting is not within the limits shown above, refer to figure 5-7 and adjust the expan sion valve as follows:

(a) Remove the hexagonal seal cap from the side of the power assembly and loosen the bonnet sea

(b) Turn the adjusting stem two complete turns to change the superheat setting by 1°F (0.55°C). Tur the stem clockwise to increase superheat span; counterclockwise to decrease it. Do not chang more than two full turns at one time, then wait at least 2 minutes for temperature to stablize an recheck pressure and temperature before further adjustment.

(c) When the proper setting is obtained, replace the hexagonal seal cap.

(16) Unwrap the insulation as necessary to remove the thermometer or thermocouple probe from th suction return line, then replace insulation as necessary (insulation tubing item 4, section II, Apper dix C) and securely tape in place (Tape item 3, section II, Appendix C).

(17) Turn the air conditioner OFF, loosen the five panel fastener screws and remove the lower front pane

(18) Fully close the suction service valve, disconnect the hose fitting from the valve, and pull the hose ou through the baffle opening in the panel.

(19) Install the baffle on the panel and tighten the four baffle fastener screws, then install the panel an tighten the five panel fastener screws.

Removal. Remove the evaporator thermal expansion valve as follows:

WARNING

Be sure the refrigeration system is fully discharged and purged, and that dry nitrogen is flowing through the system at the rate of 1 - 2 cfm (0.028 - 0.057 m^3/minute) before beginning removal of the valve.

(1) Unwrap the insulation from the evaporator coil suction return line so that the evaporator expansio valve sensing bulb is exposed, then loosen the screw and nut in the loop clamp that attaches th sensing bulb to the suction line and pull the bulb out of the clamp.

(2) Disconnect the flare fitting on the external equalizer line from the power assembly on the valve.

(3) Refer to figure 5-7 and remove the two screws that attach the power assembly to the valve body, the remove the power assembly and all other components from the valve body.

(1) Refer to figure 5-7 and disassemble power assembly and all other components from

(2) Be sure nitrogen is flowing through the refrigeration system, then position the valve b the joints to the refrigerant tubing.

(3) Install the two screws and spacers that attach the valve body to its mounting brack

(4) Refer to figure 5-7 and assemble the internal components and power assembly onto

(5) Connect the flare fitting on the external equalizer line to the power assembly on th

(6) Insert the sensing bulb into its mounting loop clamp and tighten the screw and nut

(7) Leak test the entire refrigeration system in accordance with paragraph 5-10; repair b necessary.

(8) Rewrap insulation around the sensing bulb and evaporator suction return line a appropriate tape.

CAUTION

Always replace the dehydrator every time the refrigeration pressure system has been o

(9) Replace the dehydrator and leak test the dehydrator flare fittings in accordance v 5-24.

e. Reassemble. Reassemble the air conditioner as follows:

(1) Install the conditioned air filter element, the filter retaining bracket, and the five at and washers.

(2) Install the evaporator intake grille and the 12 attaching screws and washers.

(3) Install the front fresh air damper control knob, aline the setscrew with the flat or tighten the setscrew.

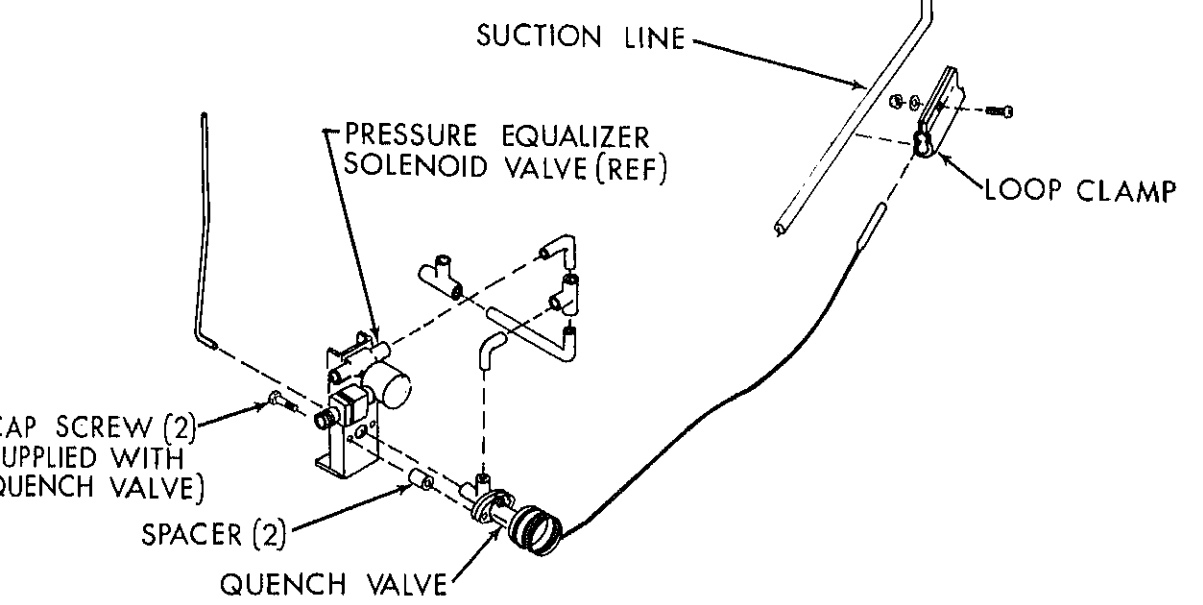
f. Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 and

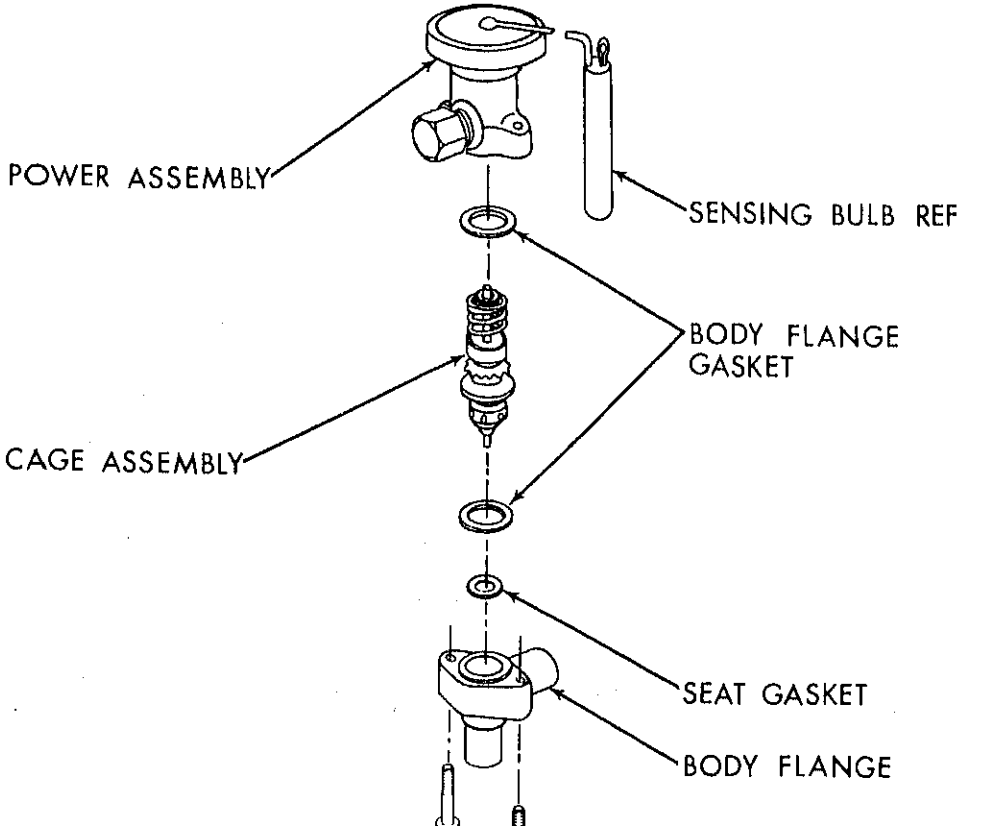
5-21. QUENCH VALVE

See figure 5-8.

e quench valve is a thermal expansion valve that meters liquid refrigerant into the suction essor to cool the hot vapors recirculated by the pressure regulating valve. The rate of refriger e quench valve is controlled by a temperature sensing bulb attached to the valve through ensing bulb is mounted on the suction line to the compressor at a point after the returned vaporator and the recirculated vapor have joined.

a. Access. The quench valve is located in the lower center section near the front, directly t junction box. The sensing bulb is attached to the suction line directly above the comp back of the cabinet. To gain access to the quench valve, it is only necessary to loose


SUCTION LINE
PRESSURE EQUALIZER
SOLENOID VALVE (REF)
LOOP CLAMP
AP SCREW (2)
UPPLIED WITH
UENCH VALVE)
SPACER (2)
QUENCH VALVE


POWER ASSEMBLY
SENSING BULB REF
BODY FLANGE
GASKET
CAGE ASSEMBLY
SEAT GASKET
BODY FLANGE

(2) Unwrap the insulation from the suction line so that the quench valve sensing bulb and an adjace section of the line is exposed.

(3) Insert the lead to a thermocouple probe through the circuit breaker access hole in the lower fro panel, attach the probe to the exposed section of the suction line using a small gob of therm mastic, if available, to improve conductivity; then rewrap the insulation around the sensing bul probe, and suction line.

(4) Insert a refrigerant hose through the circuit breaker access opening and connect the hose to th suction service valve.

(5) Install a suitable pressure gage to the outside end of the hose.

(6) Open the suction service valve and note the pressure indicated on the gage, and the temperatu indicated on the meter.

NOTE

The static pressure in the refrigeration system when the air conditioner if OFF is the pressure-temperature relationship at the given temperature of the refrigerant as shown in Table 5-1. For example: At an ambient temperature of 80°F (26.7°C) the static pressure should be approximately 145 psi (10.2 kg/cm²).

(7) Install the lower front panel and tighten the five panel fastener screws.

(8) Set the temperature thermostat control knob full INCREASE (clockwise), start the air conditioner COOL mode, note that the suction pressure drops to 58 ± 2 psi (4.0 ± 0.2 kg/cm²) and allow t compressor to run for at least 20 minutes. If the pressure is not within the above limits, test the oper tion of the pressure regulating valve (para 5-28) before proceeding with quench valve test.

NOTE

Except in a very hot climate, with the ambient temperature above 90°F (32.2°C), the refrigeration system will be in a bypass cycle with a maximum volume of hot discharge vapor being recirculated back to the suction side of the compressor through the pressure regulator valve and the quench valve.

(9) Observe that the temperature indicated remains stable for a mimimum of two minutes, then find t saturation temperature for the pressure indicated on the gage, using Table 5-1. For example: T saturation temperature for a refrigerant pressure of 69 psi (4.85 kg/cm²) is 40°F (4.4°C).

(10) Compare the saturation temperature with the indicated temperature. The indicated temperatu should be 25 ± 5°F (13.9 ± 2.2°C) higher than the saturation temperature. If the indicated te perature is not within the above limits, the quench valve is not functioning properly and should replaced.

. Removal. Remove the quench valve as follows:

Be sure the refrigeration system is fully discharged and purged, and that dry nitrogen is flowing through the system at the rate of 1 - 2 cfm (0.028 - 0.057 m^3/minute) before beginning removal of the valve.

) Unwrap the insulation from the suction line as necessary to expose the quench valve sensing bulb and the fittings on the body of the valve that must be debrazed. Take care to note the position (center top of suction line) of the bulb.

) Loosen the screw and nut in the loop clamp that attaches the sensing bulb to the suction line, and pull the bulb out of the clamp.

) Refer to figure 5-8 and remove all the removable components from the valve body.

) Remove the two screws and spacers that attach the valve body to its mounting bracket.

) Debraze the suction line tubing from the valve body, and remove the valve body.

stallation. Install the quench valve as follows:

) Refer to figure 5-8 and disassemble all removable components from the valve body.

) Be sure dry nitrogen is flowing through the system, then position the valve body and braze the joints to the suction line tubing.

) Install the two screws and spacers that attach the valve body to its mounting bracket.

) Refer to figure 5-8 and assemble the removed components on the valve body.

) Insert the sensing bulb into its mounting loop clamp and tighten the screw and nut. Be sure the bulb is centered on the top of the suction line.

) Leak test the entire refrigeration system in accordance with paragraph 5-10; repair brazed joints as necessary.

) Rewrap the insulation (item 4, section II, Appendix C) around the quench valve sensing bulb and the suction tubing at the valve body joints and secure with appropriate tape (item 3, section II, Appendix C).

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

) Replace the dehydrator and leak test the dehydrator flare fittings in accordance with paragraph 5-24.

eassembly. The only reassembly necessary is to install the lower front panel and tighten the five panel stener screws.

vacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5-12.

he evaporator thermal expansion valve only during cooling cycles when operating in COOL mode. This
nally open valve is held closed by an electrical signal during bypass cycles when operating in the C
node.

a. Access. The liquid flow solenoid valve is located in the center of the evaporator intake section abov conditioned air filter. To gain access to the valve:

(1) Loosen the setscrew and remove the front fresh air damper control knob.

(2) Remove the 12 attaching screws and washers, and remove the evaporator intake grille.

(3) Remove the five attaching screws and washers, and remove the filter retaining bracket and c tioned air filter element.

b. Testing. Electrically test the coil of the solenoid valve as follows:

WARNING

Disconnect input power to the air conditioner before performing any maintenance on the electrical system. Voltages used can be lethal.

(1) Disconnect input power at its source.

(2) Disconnect wiring harness connector P6 from connector J6 on the solenoid valve.

(3) Use a continuity tester or a multimeter set on the lowest OHMS scale to check for continuity bet pins 1 and 2 in connector J6. If continuity is not found, the coil is open and must be replace

(4) Use the continuity tester or multimeter to check for continuity between each pin in connector J the coil casing. If continuity is found between either pin and the case, the coil is grounde should be replaced.

(5) If continuity checks are satisfactory, apply 24 volts dc from an external power supply across p and 2 in connector J6, and listen for a sharp click when the valve changes position. If a click heard, internal valve problems are indicated and the entire valve should be replaced.

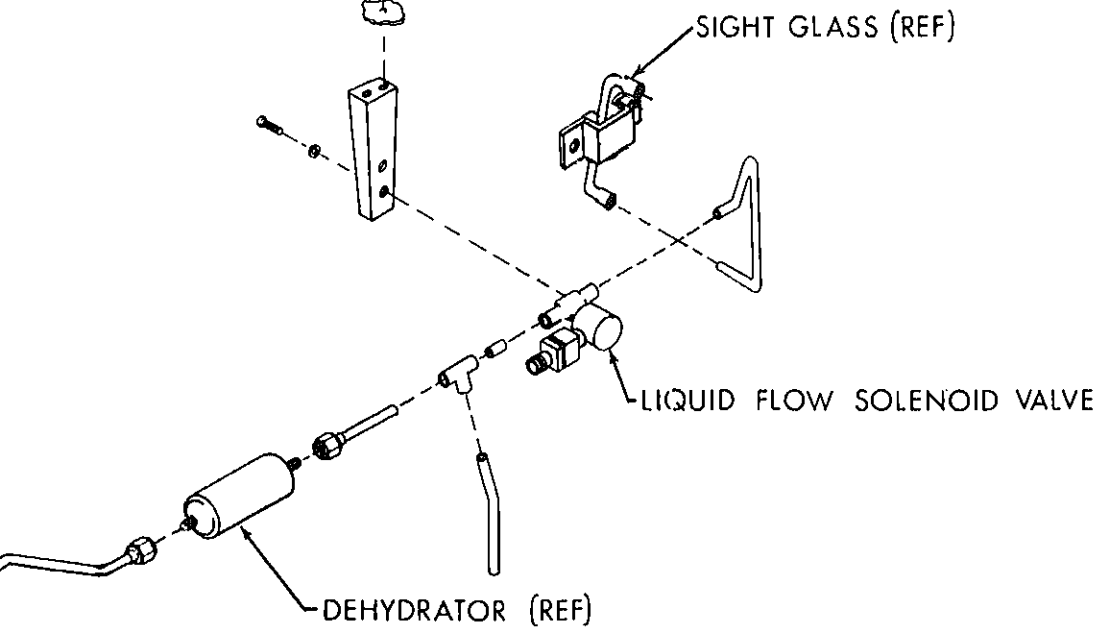
c. Coil Replacement. The coil can be replaced without opening the refrigeration pressure system. Re figure 5-9 and replace the coil as follows:

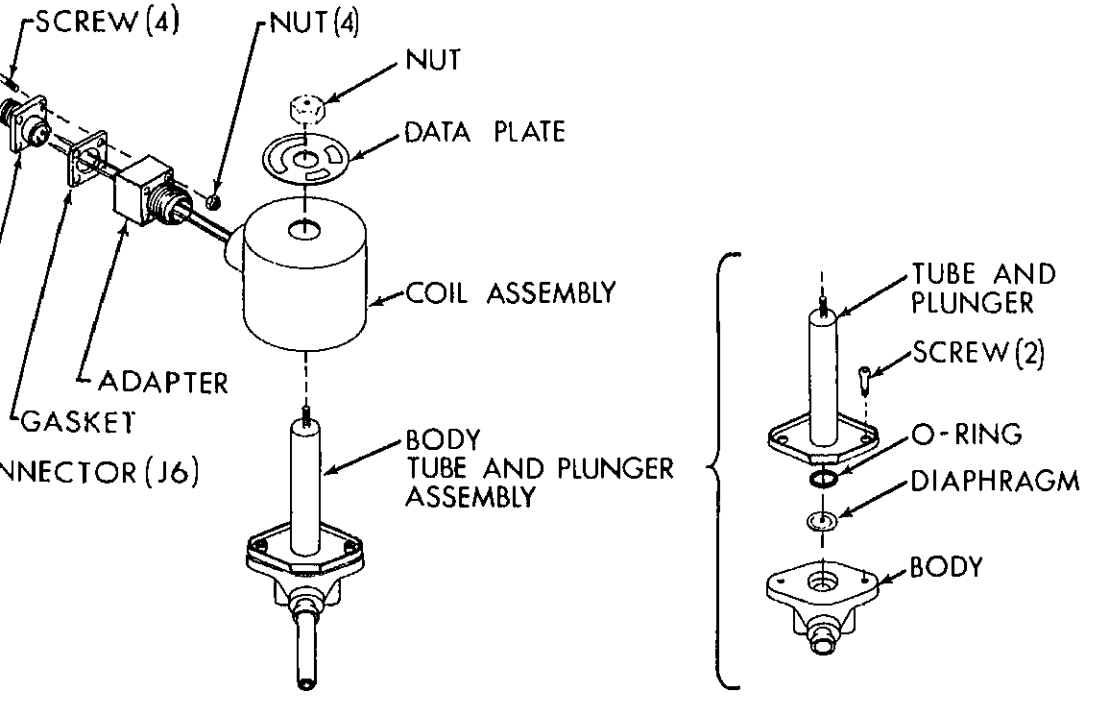
WARNING

Do not attempt any disassembly of the solenoid valve other than coil removal with a refrigerant charge in the system. Refrigerant will be sprayed out dangerously if the screws that attach the tube and plunger assembly to the valve body are loosened.

(1) Remove the nut that attaches the coil to the valve body, and remove the coil and connector a bly.

(2) Remove the four screws and nuts that attach the connector to the adapter on the coil.


SIGHT GLASS (REF)
LIQUID FLOW SOLENOID VALVE
DEHYDRATOR (REF)


SCREW (4)
NUT (4)
NUT
DATA PLATE
COIL ASSEMBLY
ADAPTER
GASKET
NNECTOR (J6)
BODY
TUBE AND PLUNGER
ASSEMBLY
TUBE AND
PLUNGER
SCREW (2)
O-RING
DIAPHRAGM
BODY

(6) Feed the coil leads through the gasket, solder them to the pins in the connector, then instal gasket/connector, and the four attaching screws and nuts on the adapter.

(7) Install the coil and connector assembly, and the attaching nut on the valve body.

d. Removal. Remove the liquid flow solenoid valve as follows:

WARNING

Be sure the refrigeration system is fully discharged and purged and that dry nitrogen is flowing through the system at a rate of 1 - 2 cfm (0.028 - 0.057 m^3/minute) before starting valve removal.

(1) Remove the nut that attaches the coil to the valve body, and remove the coil and conne assembly.

(2) Remove the two screws that attach the tube and plunger assembly to the valve body, remove the and plunger assembly, and then all other removable internal components from the valve body

(3) Remove the two screws and washers that attach the valve body to its mounting bracket.

(4) Debraze the joints of the refrigerant tubing from the valve body, and remove the valve body.

e. Installation. Install the liquid line solenoid valve as follows:

(1) Disassemble all removable components from the new valve.

(2) Be sure dry nitrogen is flowing through the system, then position the valve body and braze the j of the refrigerant tubing to the valve body.

(3) Install the two screws and washers that attach the valve body to its mounting bracket.

(4) Reassemble the internal components in the valve body and install the tube and plunger asser and two attaching screws.

(5) Install the coil and connector assembly, and attaching nut on the valve body.

(6) Connect wiring harness connector P6 to valve connector J6.

(7) Leak test the entire refrigeration system in accordance with paragraph 5-10; repair brazed join necessary.

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

(8) Replace the dehydrator and leak test the dehydrator flare fittings in accordance with parag 5-24.

2) Install the evaporator intake grille and the 12 attaching screws and washers.

3) Install the front fresh air damper control knob, aline the setscrew with the flat on the shaft, an tighten the setscrew.

4) Connect input power at its source.

Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5-12.

. PRESSURE EQUALIZER SOLENOID VALVE

See figure 5-10.

essure equalizer solenoid valve is controlled by the mode selector switch to equalize the pressure acros mpressor at all times, except when operating in COOL mode. This normally open valve is held closed b ctrical signal when the mode selector switch is in the COOL position.

Access. The pressure equalizer solenoid valve is located in the lower front section of the cabinet, direct o the right of the junction box. To gain access to the valve, it is only necessary to loosen the five pan astener screws and remove the lower front panel.

Testing. Electrically test the coil of the solenoid valve as follows:

WARNING

Disconnect input power to the air conditioner before performing any maintenance on the electrical system. Voltages used can be lethal.

1) Disconnect input power at its source.

2) Disconnect wiring harness connector P5 from connector J5 on the solenoid valve.

3) Use a continuity tester or a multimeter set on the lowest OHMS scale to check for continuity betwe pins 1 and 2 in connector J6. If continuity is not found, the coil is open and must be replaced.

4) Use the continuity tester or multimeter to check for continuity between each pin in connector J5 a the coil casing. If continuity is found between either pin and the case, the coil is grounded and mu be replaced.

5) If continuity checks are satisfactory, apply 24 volts dc from an external power supply across pins and 2 in connector J5, and listen for a sharp click when the valve changes position. If a click is n heard, internal valve problems are indicated and the entire valve should be replaced.

Coil Replacement. The coil can be replaced without opening the refrigeration pressure system. Refer igure 5-10 and replace the coil as follows:

WARNING

Do not attempt any disassembly of the solenoid valve, other than coil removal, with a

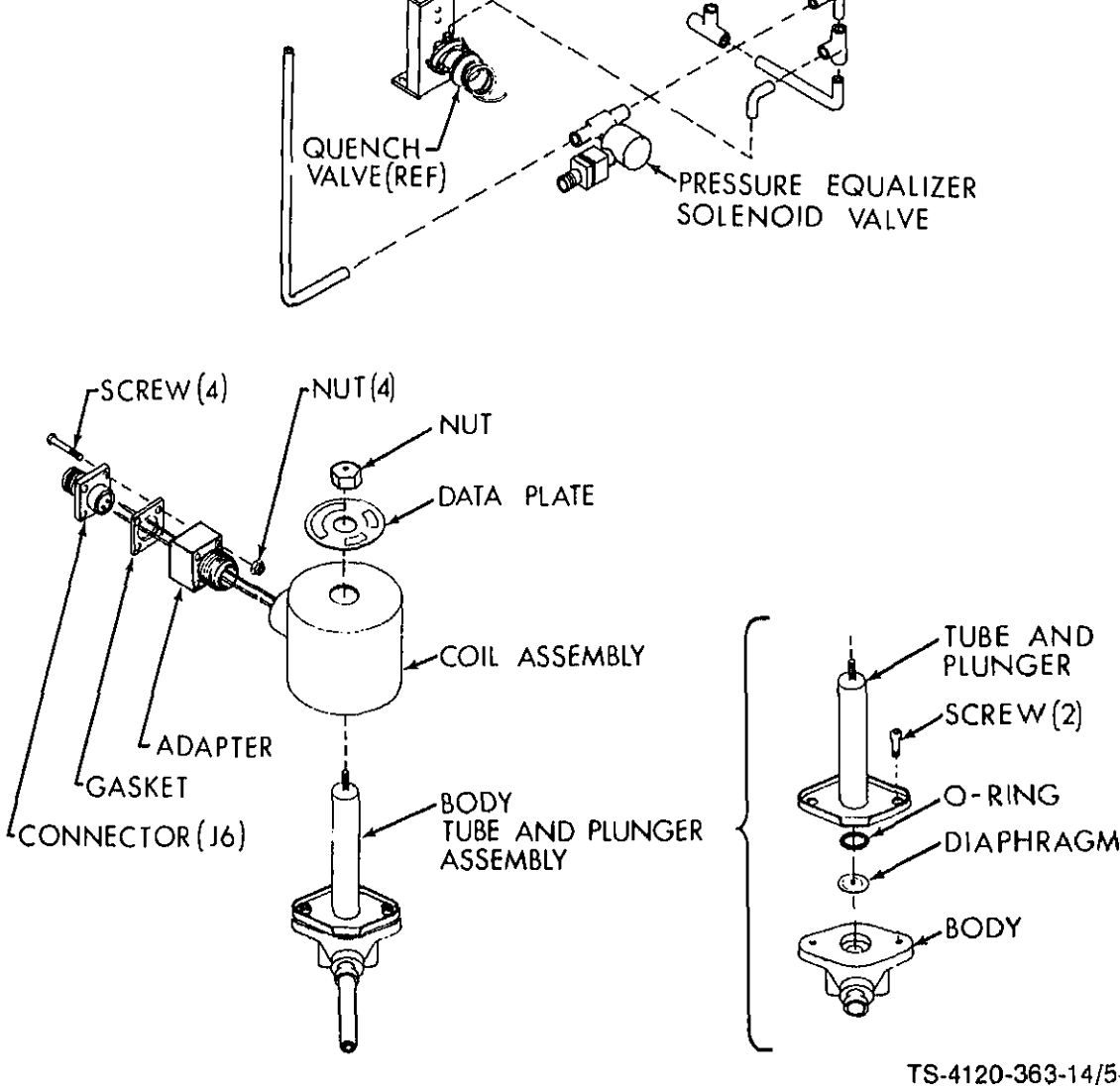


Figure 5-10. Pressure Equalizer Solenoid Valve

(1) Remove the nut that attaches the coil to the valve body, and remove the coil and connector a bly.

(2) Remove the four screws and nuts that attach the connector to the adapter on the coil.

(3) Pull the connector away from the adapter, unsolder the coil leads from the pins in the connect remove the connector and gasket.

(4) Remove the adapter from the coil casing.

(5) Feed the leads of the new coil through the adapter, and then install the adapter on the coil

WARNING

Be sure the refrigeration system is fully discharged and purged, and that dry nitrogen is flowing through the system at the rate of 1 - 2 cfm (0.028 - 0.057 m^3/minute) before starting valve removal.

(1) Remove the nut that attaches the coil to the valve body, and remove the coil and connector asse bly.

(2) Remove the two screws that attach the tube and plunger assembly to the valve body, remove the tu and plunger assembly, and then remove all other removable components from the valve body.

(3) Remove the two screws and washers that attach the valve body to its mounting bracket.

(4) Debraze the joints of the refrigerant tubing from the valve body, and remove the valve body.

Installation. Install the pressure equalizer solenoid valve as follows:

(1) Disassemble all removable components from the new valve.

(2) Be sure dry nitrogen is flowing through the system, then position the valve body and braze the joi of the refrigerant tubing to the valve body.

(3) Install the two screws and washers that attach the valve body to its mounting bracket.

(4) Reassemble the internal components in the valve body, and install the tube and plunger assemb and two attaching screws.

(5) Install the coil and connector assembly, and attaching nut on the valve body.

(6) Connect wiring harness connector P5 to valve connector J5.

(7) Leak test the entire refrigeration system in accordance with paragraph 5-10; repair brazed joints necessary.

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

(8) Replace the dehydrator and leak test the dehydrator flare fittings in accordance with paragra 5-24.

Reassembly. The only reassembly required is to install the lower front panel, tighten the five pa fastener screws, and reconnect input power at its source.

Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5-12.

24. SIGHT GLASS See figure 5-11.

Sight glass is a small chamber installed in the liquid refrigerant line. One side of the chamber has a gl

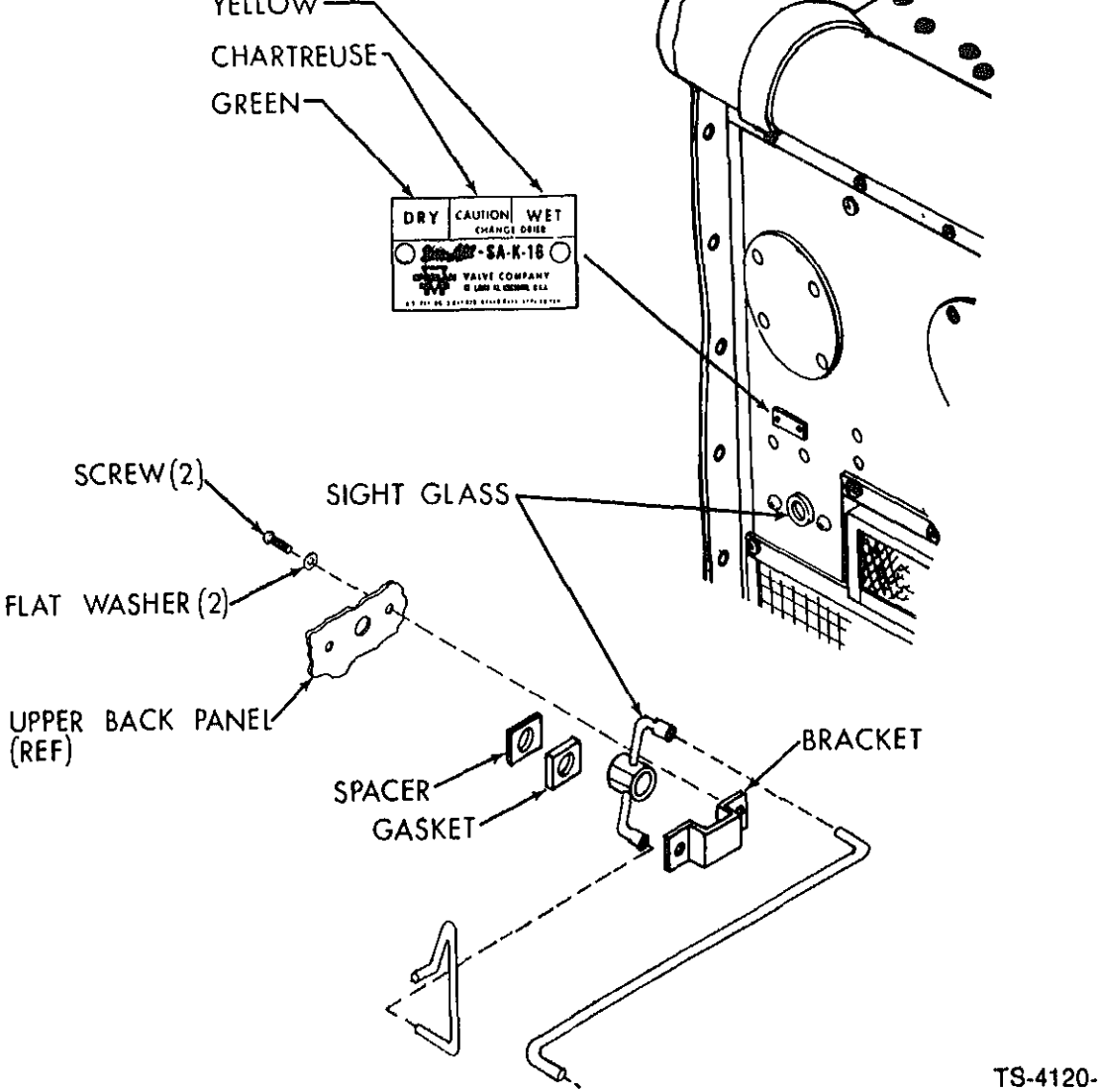


Figure 5-11. Sight Glass

has an indicator that is coated with a material that is moisture sensitive. The indicator is bright gr and fades through chartreuse hues when exposed to varying degrees of moisture until it become when saturated.

a. Access. The sight glass is mounted to the inside of the upper back panel, directly to the left o filter mounting frame. The mounting screws and washers are installed from the outside of th panel. To gain access to the sight glass:

(1) Loosen the setscrew and remove the front fresh air damper control knob.

(2) Remove the 12 attaching screws and washers, and remove the evaporator intake gri

Be sure the refrigeration system is fully discharged and purged, and that dry nitrogen is flowing through the system at a rate of 1 - 2 cfm (0.028 - 0.057 m^3/minute) before starting sight glass removal.

(1) Remove the two attaching screws and washers from the outside of the upper back panel, t remove the sight glass mounting bracket from the inside.

(2) Debraze the joints of the refrigerant tubing from the sight glass.

(3) Remove the sight glass and the gasket and spacer between it and the upper back panel.

Installation. Install the sight glass as follows:

(1) Be sure dry nitrogen is flowing through the system, then position the spacer, gasket, and sight gl and braze the joints on the refrigerant tubing to the sight glass.

(2) Position the sight glass mounting bracket on the inside and install the two attaching screws washers from the outside of the upper back panel.

(3) Leak test the entire refrigeration system in accordance with paragraph 5-10; repair brazed joint necessary.

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

(4) Replace the dehydrator and leak test the dehydrator flare fittings in accordance with paragr 5-24.

Reassembly. Reassemble the air conditioner as follows:

(1) Install the conditioned air filter element, the filter retaining bracket and the five attaching screws washers.

(2) Install the evaporator intake grille and the 12 attaching screws and washers.

(3) Install the front fresh air damper control knob, aline the setscrew with the flat on the shaft and tig the setscrew.

Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5-12.

. DEHYDRATOR See figure 5-12.

ehydrator is a metal canister containing a desiccant filtering media. The liquid refrigerant from the c r coil flows through the dehydrator before it is delivered to the evaporator coil. The dehydrator mus ed after each time the refrigeration pressure system has been opened for any reason. Replacement of rator should be the final maintenance action prior to evacuation and charging of the system.

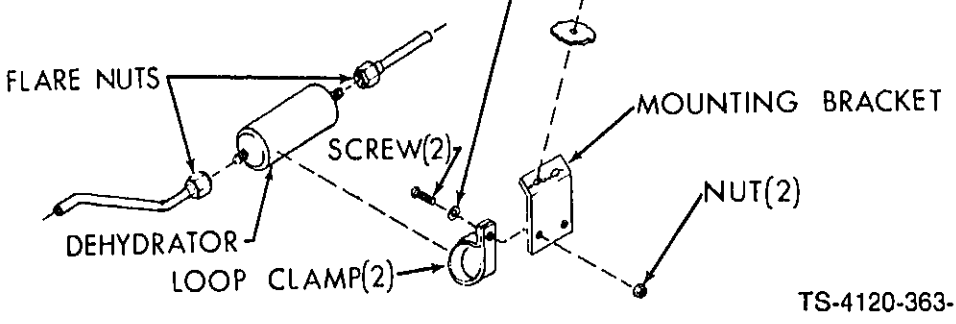


Figure 5-12. Dehydrator

(1) Loosen the setscrew and remove the front fresh air damper control knob.

(2) Remove the 12 attaching screws and washers, and remove the evaporator intake grille.

(3) Remove the five attaching screws and washers, and remove the filter retaining brac conditioned air filter element.

b. Removal. Remove the dehydrator as follows:

WARNING

Be sure the refrigeration system is fully discharged. If the flare fittings are loosened when the system is charged, liquid refrigerant will be sprayed out dangerously.

(1) Disconnect the flare fitting at each end of the dehydrator canister.

(2) Remove the two nuts, washers, and screws that attach the two cushioned loop clamps dehydrator mounting bracket. Hold the dehydrator when removing the screws to prevent it fr ing.

(3) Remove the dehydrator and loop clamps, remove the loop clamps from the canister for reu discard the dehydrator.

c. Installation. Install the new dehydrator as follows:

CAUTION

Replacement dehydrators are packaged with sealing caps on the flare fittings to prevent moisture contamination of the desiccant filtering media. Remove these caps immediately prior to installation. Never install a dehydrator from which caps have been removed for an extended or unknown period of time.

(1) Position the two cushioned loop clamps on the canister for mounting so that the directional row on the canister is pointed to the right hand side of the air conditioner.

Reassembly. Reassemble the air conditioner as follows:

(1) Install the conditioned air filter element, the filter retaining bracket, and the five attaching screw and washers.

(2) Install the evaporator intake grille, and the 12 attaching screws and washers.

(3) Install the front fresh air damper control knob, align the setscrew with the flat on the shaft, an tighten the setscrew.

Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5-12.

. PRESSURE CUTOUT SWITCHES

See figure 5-13.

gh-pressure and low-pressure cutout switches are protective devices that interrupt electrical power mpressor if discharge pressure rises too high or suction pressure falls too low. These are both pressu ed, single-pole, double-throw switches provided with manual reset buttons. The high-pressure switch lly closed and trips open if the discharge pressure rises above 460 psi (32.4 kg/cm²). The low-pressu is normally open, is held closed as long as suction pressure remains above 7 psi (0.5 kg/cm²), and tr on lower pressure. Refrigerant pressure is provided to the switches through capillaries that a cted to the refrigerant lines adjacent to the discharge and suction service valves.

Access. The high-pressure and low-pressure cutout switches are mounted in a single enclosure which attached to the inside of the lower left-hand side of the lower back panel of the cabinet, with the reset bu tons protruding through the panel. Since the location of the switch enclosure is directly behind the cor pressor, it can be reached through the lower front panel opening only with great difficulty. The recor mended method of access is to refer to paragraphs 4-33 and figure 4-34 and remove the lower back pane

Testing. After the lower back panel is removed, electrically test the switches as follows:

WARNING

Disconnect input power from the air conditioner before performing any maintenance on the electrical system. Voltages used can be lethal.

NOTE

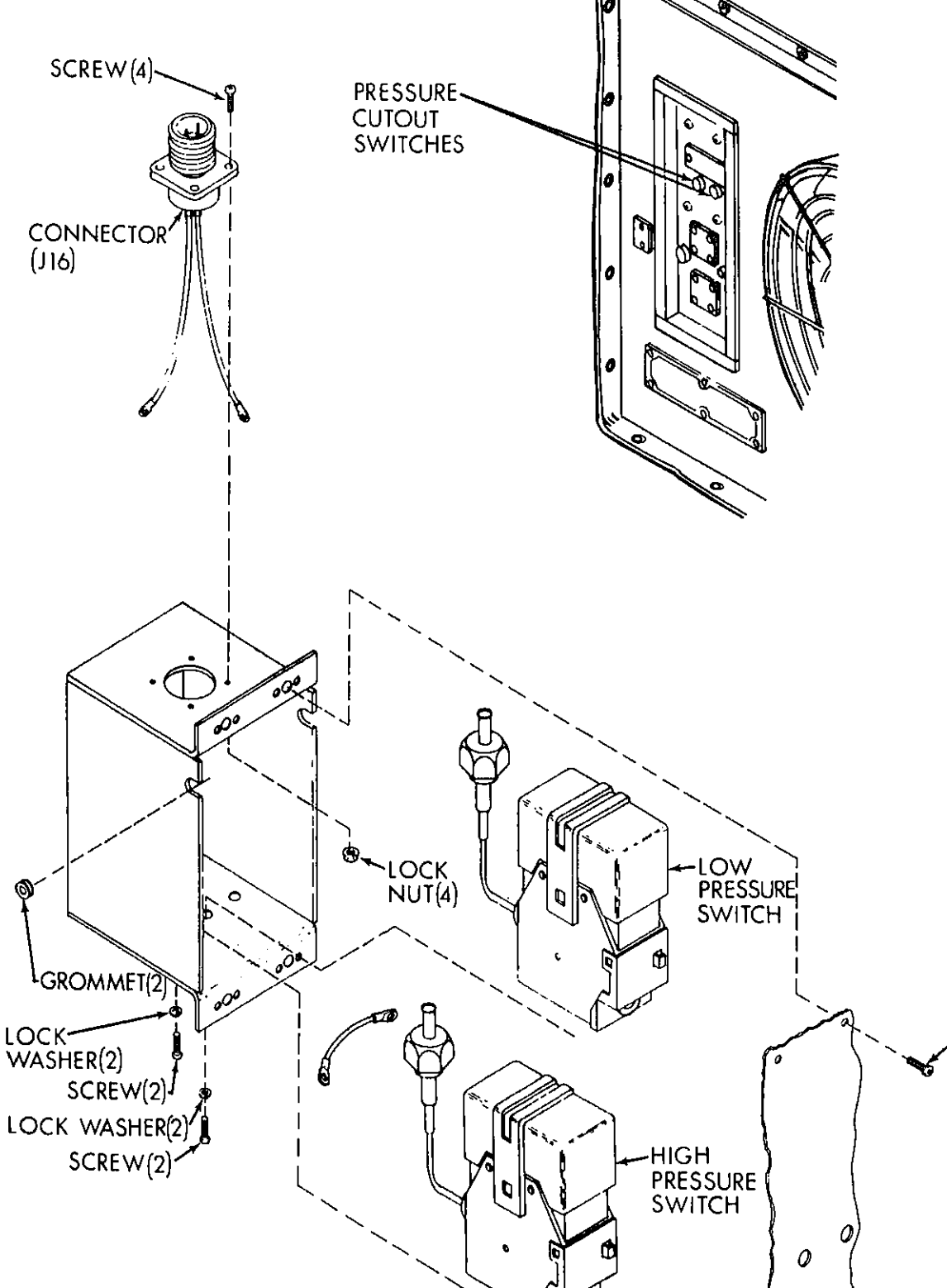
In this case, input power should already have been disconnected as part of the procedure for removal of the lower back panel.

(1) Disconnect wiring harness connector P16 from connector J16 on the enclosure.

(2) Press and release each reset button to insure switches are not tripped, then use a continuity tester a multimeter set on the lowest OHMS scale to check for continuity between pins 1 and 2 in connect J16. Since the switches are electrically connected in series, if there is continuity between the pir both switches are properly closed. If either switch is open, there will be no continuity.

(3) Remove the two screws and washers that attach each switch to the bottom of the enclosure.

(4) Pull both switches out of the enclosure, being careful not to damage or kink the capillaries.


SCREW(4)
CONNECTOR (J16)
PRESSURE CUTOUT SWITCHES
LOCK NUT(4)
LOW PRESSURE SWITCH
GROMMET(2)
LOCK WASHER(2)
SCREW(2)
LOCK WASHER(2)
SCREW(2)
HIGH PRESSURE SWITCH

be replaced.

Removal. Assuming the above tests have been performed, remove a defective pressure cutout switc follows:

WARNING

Be sure the refrigeration system is fully discharged and purged, and that dry nitrogen is flowing through the system at the rate of 1 - 2 cfm (0.028 - 0.057 m^3/minute) before disconnecting the capillary.

(1) Disconnect the flare fitting on the capillary from the adapter on the refrigerant line.

(2) Pull the capillary through to the back and remove the switch.

Installation. Install a pressure cutout switch as follows:

(1) Carefully feed the capillary through the compressor section from the back.

(2) Connect the flare fitting on the capillary to the adapter on the refrigerant line.

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

(3) Replace the dehydrator in accordance with paragraph 5-24 and leak test the flare fitting on bot dehydrator and the capillary of the pressure cutout switch.

(4) With leak test pressure in the system, first press and release the reset buttons on both pres cutout switches, then use a continuity tester or a multimeter to check for continuity bet terminals 1 and 2 on each switch to ensure that both switches are closed properly.

(5) Connect the appropriate wire terminal to the terminals on both switches.

(6) Push both switches into the enclosure being careful not to damage or kink the capillaries positioning them and their grommets in the slots in the enclosure.

(7) Install the two screws and washers that attach each switch to the bottom of the enclosure.

Reassembly. Refer to paragraph 4-33 and figure 4-34 and install the lower back panel.

Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5-12.

. CONDENSER COIL See figure 5-14.

ondenser coil is a heat exchanger that serves to cool the hot, compressed refrigerant vapor from

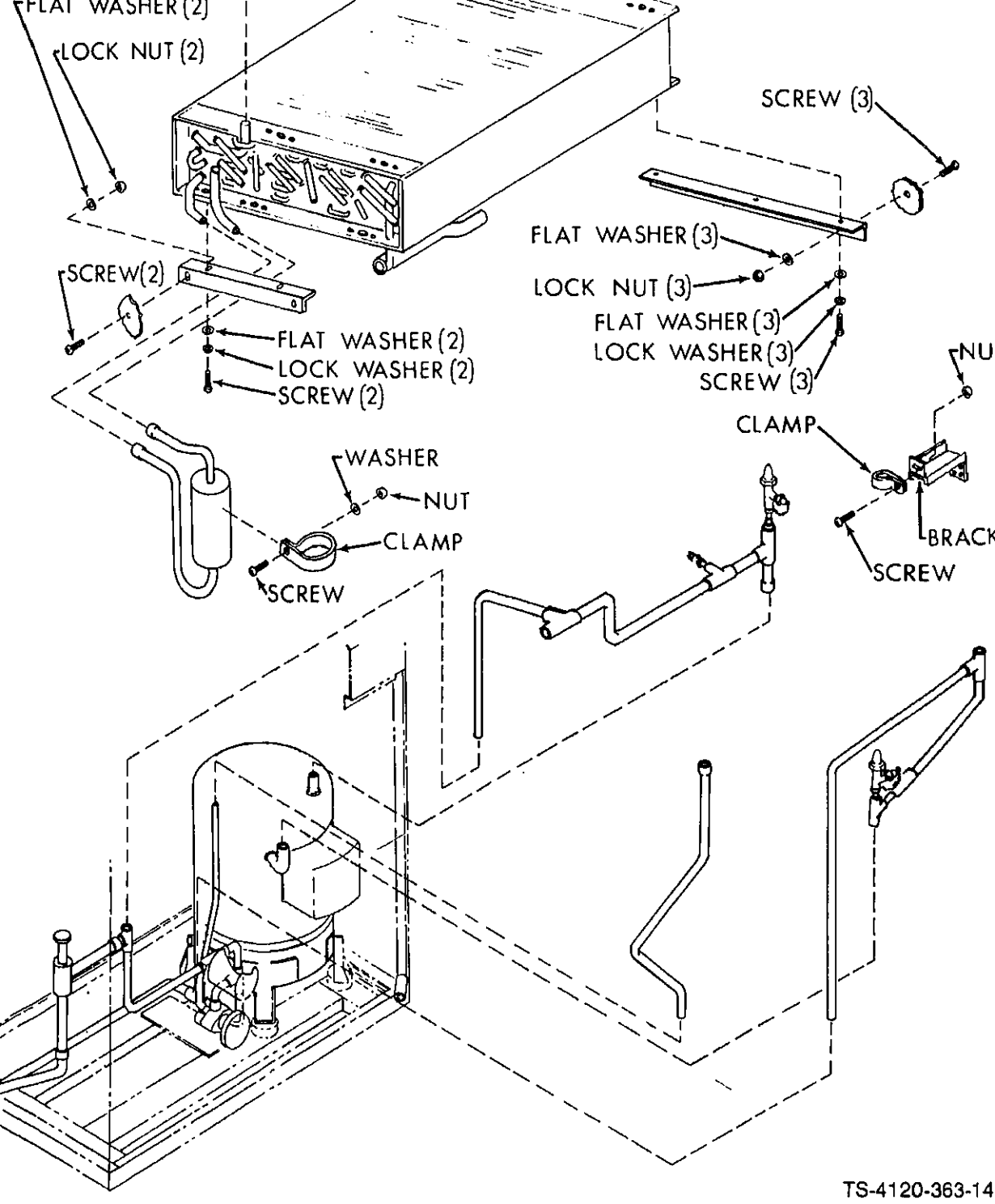


Figure 5-14. Condenser Coil

) Refer to paragraph 4-33 and figure 4-34 and remove the lower back panel.

) Refer to paragraph 4-25 and figure 4-24 and remove the junction box.

) Refer to the applicable portions of paragraphs 4-26.b. (3) and 4-26.b. (4) and remove the upper end o the J17-J18, J19-J20, and J12-P14 wiring harnesses so that the wires are pulled down through the grommets in the condenser coil frame and are out of the way.

WARNING

Be sure the refrigeration system is fully discharged and purged, and that dry nitrogen is flowing through the system at a rate of 1 - 2 cfm (0.028 - 0.057 m^3/minute) before debrazing.

Discharge and purge the refrigerant system. See paragraphs 5-8 and 5-9.

See figure 5-14 and debraze tube assemblies as indicated to provide a clear area down to the heigh of the compressor.

Totally remove all clamps and brackets from the sides of the cabinet in the lower section down to the height of the compressor.

Remove the three nuts, washers, and screws that attach the lower left hand condenser coil mountin bracket to the left side panel of the casing, then remove the two screws, flat washers and loc washers that attach the bracket to the condenser coil frame, and remove the bracket.

Remove the two nuts, washers, and screws that attach the lower right hand condenser coil mountin bracket to the right side panel of the casing, then remove the two screws, flat washers, and loc washers that attach the bracket to the condenser coil frame, and remove the bracket.

Support, or have someone hold the condenser coil, then remove the three screws, flat washers, an lock washers that attach the condenser coil frame to the upper mounting bracket on each side.

CAUTION

Take care not to damage coil return bends on side panel retained nuts when removing the condenser coil. Coil fins are sharp and easily damaged. Use rags or wear gloves when removing coil to avoid cuts and reduce fin damage.

) Carefully work the condenser coil out the back of the casing.

tallation. Install the condenser coil as follows:

Carefully work the condenser into position through the back of the casing.

Support, or have someone hold the condenser coil in position, and install the three screws, fla washers, and lock washers that attach the condenser coil frame to the upper mounting bracket o each side.

(4) Install the lower left hand condenser coil mounting bracket and the two screws, flat washers, a lock washers that attach it to the condenser coil frame, then install the three screws, washers, a nuts that attach the bracket to the left side panel of the casing.

(5) Be sure dry nitrogen is flowing through the refrigeration system, then reassemble and braze all joir of refrigerant tubing disassembled for removal of the condenser coil.

(6) Reinstall all clamps and brackets in the upper section of the compressor compartment.

(7) Refer to the applicable portions of paragraphs 4-26.e.(4) and 4-26.3.(5) and install the upper ends the J17-J18, J19-J20, and J12-P14 wiring harnesses.

(8) Check fins for dents, bent edges or any condition that would block or distort airflow. Straighten damaged fins with a plastic fin comb.

(9) Leak test the entire refrigeration system in accordance with paragraph 5-10; repair brazed joints necessary.

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

(10) Replace the dehydrator and leak test the dehydrator flare fittings in accordance with paragra 5-24.

. Reassembly. Refer to paragraph 4-33 and figure 4-34 and install the lower back panel.

. Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5-12.

-28. COMPRESSOR See figure 5-15.

compressor and motor assembly are hermetically sealed in a metal canister. The crankcase heat nent, the heater thermostat, and the electrical connector are attached to the canister externally and may aced without opening the refrigeration pressure system.

. Access. The compressor is located in the lower right hand side of the cabinet and is mounted on the bas To gain access to the compressor, it is only necessary to loosen the five panel fastener screws a remove the lower front panel.

. Testing. Electrically test the heater element, heater thermostat, wiring harness, and motor as follows

WARNING

Disconnect input power to the air conditioner before performing any maintenance to the electrical system. Voltages used can be lethal.

(1) Disconnect input power at its source.

(2) Disconnect wiring harness connector P11 from connector J11 in the compressor terminal box.

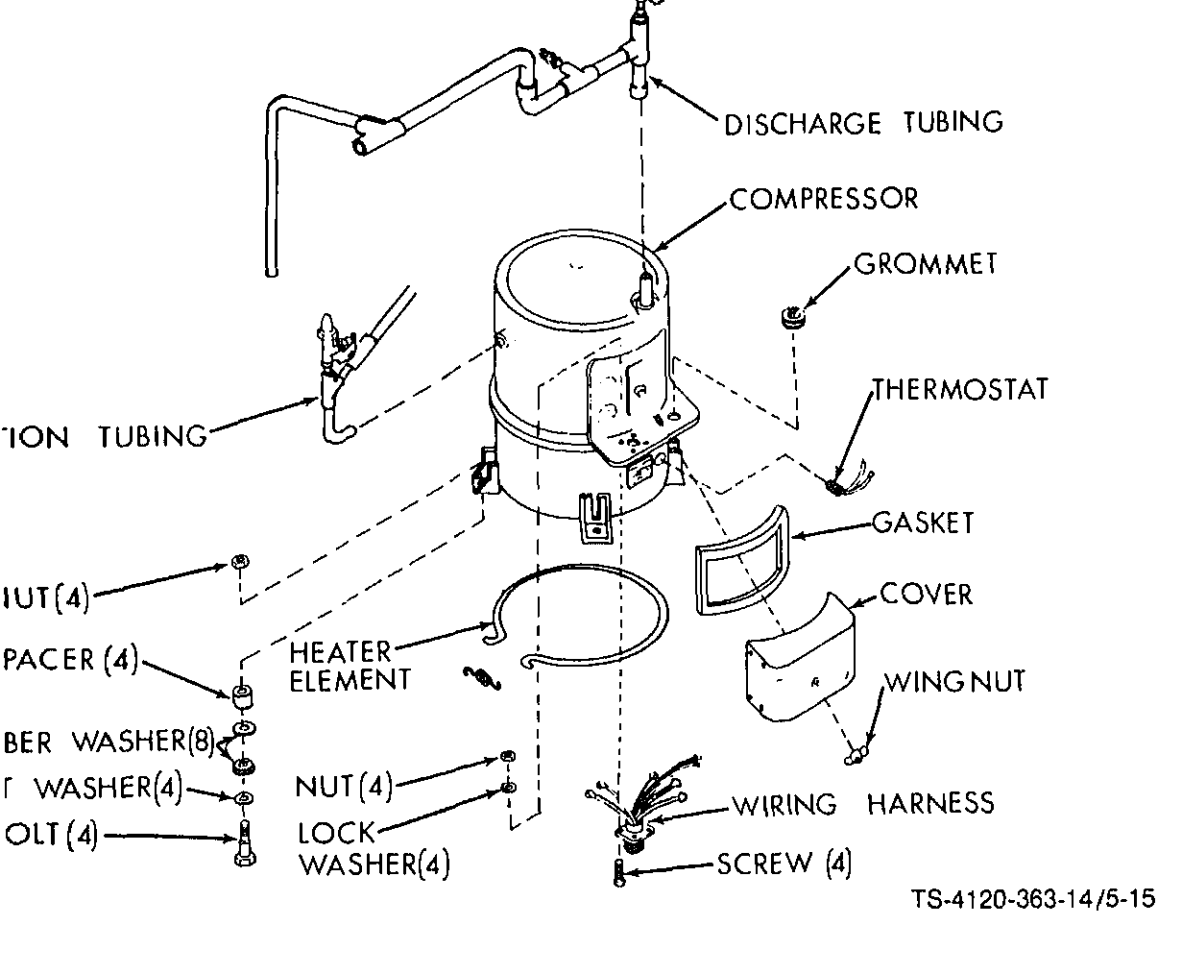


Figure 5-15. Compressor.

spect the internal wiring in the terminal box to ensure no wires are broken or grounded.

se a continuity tester or a multimeter set on the lowest OHMS scale to check for continuity between ns G and H in connector J11. If there is continuity between these pins, both the heater element and ermostat are all right. If there is no continuity between the pins, bare the splice between the heater ad and thermostat lead, and separately check for continuity between pin G and the splice, and pin and the splice. If there is continuity between pin G and the splice, but not between pin H and the lice, the heater element is all right and the thermostat is bad. If there is continuity between pin H d the splice, but not between pin G and the splice, the thermostat is all right and the heater ement is bad. If there is no continuity between either pin and the splice, both the element and the ermostat are bad.

.e the continuity tester or multimeter to check for continuity between potted terminals 1 and 2. If ere is no continuity, the motor thermal overload, overcurrent protector is open and the compressor ust be replaced.

(2) Unsolder the other heater lead from pin G in connector J11, or the other thermostat lead from pin I connector J11.

(3) To remove the heater element, pull the leads through the grommet in the bottom of the terminal remove the spring between the ends of the element, spread the element and work it to the top o compressor for removal.

(4) To remove the thermostat, pull the leads through the grommet in the bottom of the terminal box pull the thermostat out of its mounting hole.

(5) To install the heating element, spread the new element as little as possible while working it over top of the compressor and down into position, install the spring between the ends, and feed the le through the grommet in the bottom of the terminal box.

(6) To install the thermostat, push it into its mounting hole, and feed the leads through the gromm the bottom of the terminal box.

(7) Slip a piece of shrink tube insulation over one of the leads to be spliced, solder the splice, posi the shrink tube and heat it.

(8) Solder the other heater lead to pin G in connector J11, or the other thermostat lead to pin I connector J11.

d. Removal. The compressor is mounted to the cabinet base by four bolts that are inserted from the un side of the base. In order to remove the compressor, it is necessary that the entire air conditione raised and placed on blocks of sufficient height to allow for removal of these bolts from below the b Remove the compressor as follows:

(1) Remove the hardware used to anchor the cabinet base.

(2) Remove the upper support from the back of the cabinet, if used.

(3) If installed in an exterior wall, remove the filler plate above the top panel and remove the insula between the sides of the cabinet and the wall.

(4) If appropriate, remove the condensate drain line from the base fitting.

(5) Attach an overhead hoist to the lifting fitting on each side of the cabinet, using a sling and spre bar.

(6) Raise the cabinet and place it on blocks at least four inches high. (If installed in a wall, the cab may have to be moved into the room so that it can be raised high enough.) Be sure the blocks do obstruct the holes in the base through which the compressor mounting bolts must be removec

(7) Disconnect wiring harness connector P11 from connector J11 on the compressor terminal box

(8) Unwrap the insulation from the suction line so that the joint on the compressor is exposed.

WARNING

Be sure the refrigeration system is fully discharged and purged, and that dry nitrogen is flowing through the system at a rate of 1 - 2 cfm (0.028 - 0.057 m³/minute) before starting debrazing

bolt heads from beneath the base while the nuts are removed.) Remove the bolts, flat washers and rubber washers from the underside of the base.

WARNING

The compressor weighs approximately 85 lbs. (38.6 kg). Use care in the following steps to avoid crushing the hands.

) Lever or tilt the compressor and remove the spacer and rubber washer from under each of the four mounting legs.

) Remove the compressor through the lower front panel opening.

tallation. Install the compressor as follows:

Lift the compressor through the lower front panel opening and position it on the cabinet base.

Lever or tilt the compressor and install the rubber washer and spacer between each of the four compressor mounting legs and the base.

Install a flat washer and a rubber washer on each of the four mounting bolts, then insert the bolts from beneath the base and install the nuts on the bolts.

Be sure dry nitrogen is flowing through the system, then reassemble discharge and suction refrigerant tubing, and braze all joints.

Leak test the entire refrigeration system in accordance with paragraph 5-10; repair brazed joints as necessary.

Rewrap the insulation around the suction line and secure with appropriate tape.

Connect wiring harness connector P11 to connector J11 on the compressor terminal box.

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

Replace the dehydrator and leak test the dehydrator flare fittings in accordance with paragraph 5-24.

Raise the cabinet with the overhead hoist, remove the blocks, position as necessary for installation, lower to the floor, and remove the hoist, sling, and spreader bar.

) Install the hardware used to anchor the cabinet base.

) If used, install the upper support on the back of the cabinet.

) If installed in a wall opening, install the filler plate above the top panel, and the insulation between

g. Evacuate and charge the system in accordance with paragraphs 5-11 and 5-12.

5-29. PRESSURE REGULATING VALVE

See figure 5-16.

The pressure regulating valve opens on response to decreasing pressure on its outlet side. Its purpo allow recirculation of refrigerant vapor from the discharge side of the compressor to the suction sid compressor at a rate necessary to maintain a minimum pressure in the suction line.

a. Access. The pressure regulating valve is located at the left side of the lower section of the directly behind the junction box. To gain access to the pressure regulating valve for testing and ment, it is only necessary to loosen the five panel fastener screws, and remove the lower front

b. Testing/Adjustment. Test the operation and adjust the pressure regulating valve as follows:

(1) Loosen the four panel fastener screws and remove the circuit breaker access panel from the of the lower front panel.

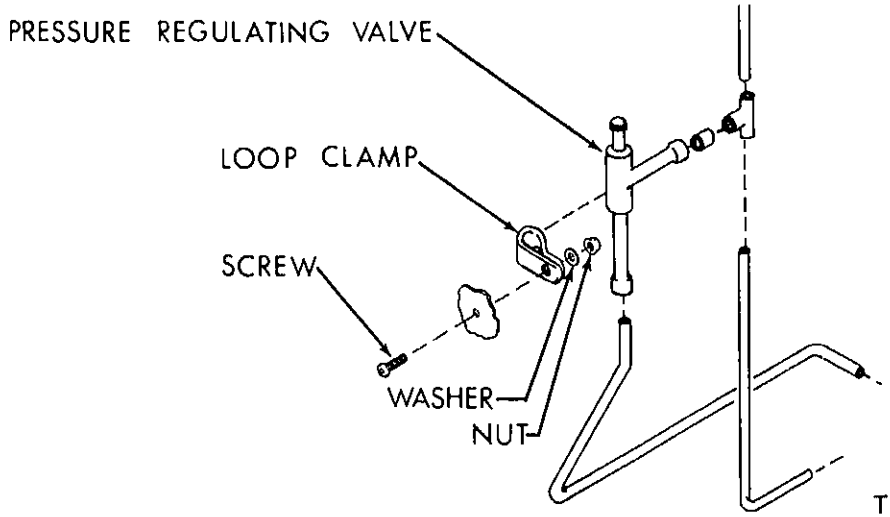
(2) Insert a refrigerant hose through the circuit breaker access opening and connect the hos suction service valve. Install a suitable pressure gage to the outside end of the hose.

(3) Open the suction service valve and note the pressure indicated on the gage.

NOTE

The static pressure in the refrigeration system when the air conditioner is OFF is the pressure-temperature relationship at the given temperature of the refrigerant as shown in Table 5-1. For example: At an ambient temperature of 80°F (26.7°C) the static pressure should be approximately 145 psi (10.2 kg/cm²).

(4) Install the lower front panel and tighten the five panel fastener screws.



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kg/cm²) shortly after the compressor starts, and then remain constant.

6) To adjust suction pressure, remove the button plug from the top of the pressure regulating valve a turn the adjusting stem clockwise to raise (increase) pressure, or counterclockwise to low (decrease) pressure. If pressure is low (below 56 psi) and cannot be raised by adjustment, the pre sure regulating valve must be replaced. If the pressure is high (above 60 psi) and cannot be lower by adjustment, test the operation of the quench valve (para 5-20) before replacing the pressu regulating valve.

emoval. Remove the pressure regulating valve as follows:

WARNING

Be sure the refrigeration system is fully discharged and purged, and that dry nitrogen is flowing through the system at a rate of 1-2 cfm (0.028 - 0.057 m³/minute) before beginning removal of the valve.

) Refer to paragraph 4-25.b. and figure 4-24 and remove the junction box.

2) Remove the nut, washer, screw, and loop clamp that attach the pressure regulating valve to the l side panel of the casing.

3) Debraze the suction tubing joints from the valve, and remove the valve.

stallation. Install the pressure regulating valve as follows:

) Be sure dry nitrogen is flowing through the system, then position the valve, and braze the suction li joints to the valve.

2) Leak test the entire refrigeration system in accordance with paragraph 5-10; repair brazed joints necessary.

3) Install the screw, loop clamp, washer, and nut that attach the valve to the left side panel of the c ing.

4) Refer to paragraph 4-25.g. and figure 4-24 and install the junction box.

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

5) Replace the dehydrator and leak test the dehydrator flare fittings in accordance with paragra 4-24.

eassembly. The only reassembly required is to install the lower front panel and tighten the five pa stener screws.

e receiver is a collection chamber for the refrigerant as it is condensed from a vapor into a liquid. As mpressed refrigerant from the discharge of the compressor enters the tubing in the condenser coil. por. As the air passing over the outside of the coil removes heat, the vapor begins to condense int oplets and there is a mixture of vapor and liquid in the tubing. The receiver is connected to the conder bing about halfway through the condenser coil. The receiver serves two purposes: (1) Collection of th the receiver ensures that liquid refrigerant delivered into the lines and valves to the evaporator coil c nimum of vapor bubbles; (2) retention of the liquid refrigerant in the receiver minimizes the flowback o the discharge line of the compressor when the compressor is stopped.

a. Access. The receiver is located in the lower left hand side of the cabinet, directly behind the junct and the pressure regulating valve. However, the joints to the condenser coil tubing are made jus the lower left hand back corner of the condenser coil. To gain access to the receiver, it is neces refer to paragraph 4-33 and figure 4-34, and remove the lower back panel.

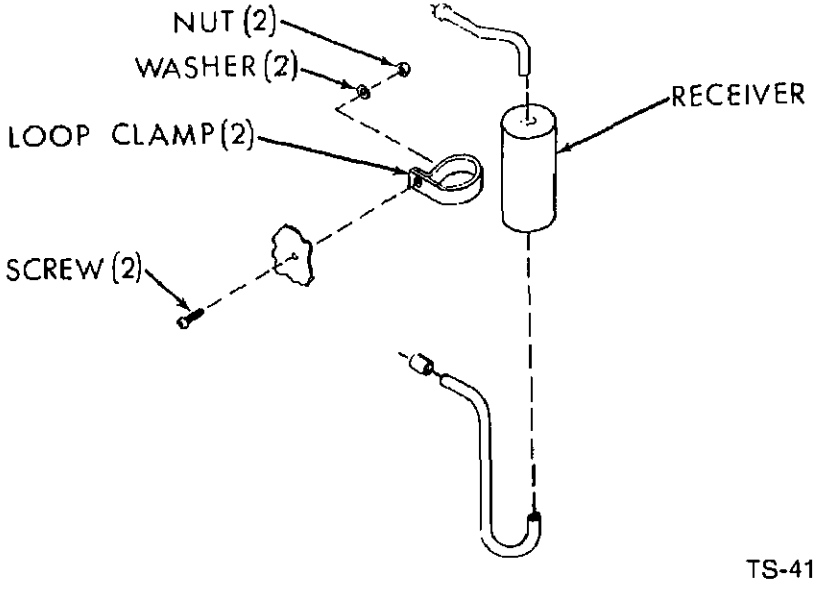

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Figure 5-17. Receiver

b. Removal. Remove the receiver as follows:

WARNING

Be sure the refrigeration system is fully discharged and purged and that dry nitrogen is flowing through the system at a rate of 1-2 cfm (0.028 - 0.057 m^3/minute) before debrazing.

(1) Remove the two nuts, washers, screws, and loop clamps that attach the receiver to the left si of the casing.

(2) Debraze the joints of the condenser coil tubing from the inlet and outlet tubing on the recei

of the casing.

3) Leak test the entire refrigeration system in accordance with paragraph 5-10; repair brazed joints necessary.

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

1) Replace the dehydrator and pressure test the dehydrator flare fittings in accordance with paragra 5-24.

eassembly. Refer to paragraph 4-33 and figure 4-34 and install the lower back panel.

vacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5-12.

CHECK VALVE See figure 5-4.

eck valve allows liquid refrigerant to flow from the outlet of the condenser coil into the refrigera components in the upper section of the cabinet, but prevents it from flowing back in the opposite di e check valve prevents a gravity flowback of liquid refrigerant into the condenser that might flood ssor discharge line when the compressor is not running.

ccess. The check valve is located above and near the back of the upper left-hand corner of the enser coil. To gain access to the check valve, it is only necessary to remove the 12 attaching scr ock washers, and flat washers, and remove the condenser intake screen.

WARNING

Be sure the refrigeration system is fully discharged and purged, and that dry nitrogen is flowing through this system at a rate of 1-2 cfm (0.028 - 0.057 m^3/minute) before debrazing.

emoval. Debraze the joints of the refrigerant tubing from the valve body, and remove the check va

stallation. Install the check valve as follows:

) Be sure dry nitrogen is flowing through the refrigeration system, then position the check valve sure the directional flow arrow is pointed UP, and braze the joints of the refrigerant tubing to valve body.

) Leak test the entire refrigeration system in accordance with paragraph 5-10; repair brazed joints necessary.

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

Replace the dehydrator and leak test the dehydrator flare fittings in accordance with paragra

5-32. PRESSURE RELIEF VALVE

See figure 5-4.

The pressure relief valve is a safety device designed to prevent rupture of the refrigeration system that mig caused by excessive refrigerant pressure. The valve is preset at manufacture to open at 540 psi (37.8 kg and will allow refrigerant to escape from the system if refrigerant pressure exceeds this limit.

a. Access. The pressure relief valve is located above and near the back of the upper left hand corner condenser coil in the refrigerant line immediately after the check valve. To gain access to the pre relief valve, it is only necessary to remove the 12 attaching screws, lock washers, and flat washers remove the condenser intake screen.

WARNING

Be sure the refrigeration system is fully discharged and purged, and that dry nitrogen is flowing through the system at a rate of 1-2 cfm (0.028 - 0.057 m^3/minute) before removing the pressure relief valve.

b. Removal. Hold the fitting on the adapter with a wrench, unscrew the pressure relief valve fro adapter, and remove the valve.

c. Installation. Install the pressure relief valve as follows:

(1) Hold the adapter with a wrench, screw the pressure relief valve into the adapter, and tighten

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

(2) Replace the dehydrator in accordance with paragraph 5-24, and leak test the flare fittings or the dehydrator and the pressure relief valve.

d. Reassembly. Install the condenser intake screen and the 12 attaching screws, lock washers, an washers.

e. Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5-12.

5-33. TANK (ACCUMULATOR)

See figure 5-18.

This tank serves as a secondary receiver and assists in the assurance of an uninterrupted flow of bubbl liquid refrigerant to the evaporator expansion valve.

a. Access. The tank is located at the back in the center of the evaporator intake section abov conditioned air filter. To gain access to the tank:

(1) Loosen the setscrew and remove the front fresh air damper control knob.

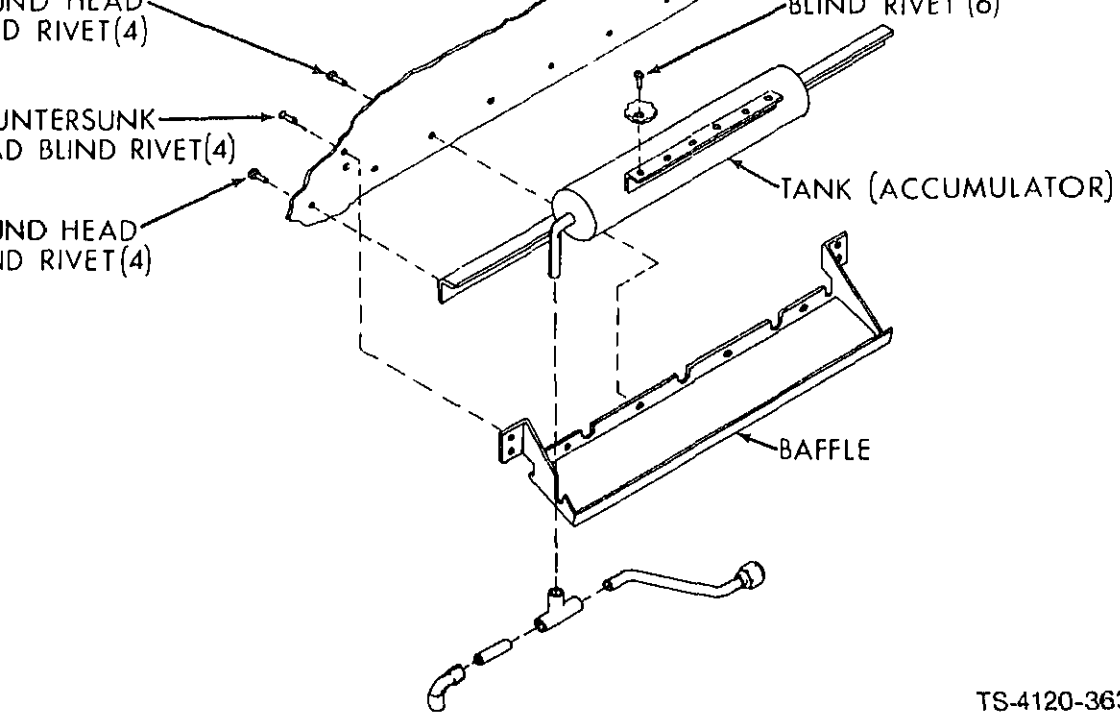


Figure 5-18. Tank (Accumulator)

) Remove the five attaching screws and washers, and remove the filter retaining bracket ar
conditioned air filter element.

emoval. Remove the tank as follows:

WARNING

Be sure the refrigeration system is fully discharged and purg
through the system at the rate of 1-2 cfm (0.028 - 0.057 m^3/m^{1-}
ank.

Refer to paragraph 4-15.b. and figure 4-12 and remove

Remove the two screws and lock washers that attach tl
ing bracket to the bottom panel of the casing.

Remove the seven attaching screws and loc
frame and the fresh air filter element.

Drill out the four round head and four counters
back panel of the casing, then remove the ba

(6) Drill out the six blind rivets that attach the top front angle bracket on the tank to the bottom panel of the casing.

(7) Debraze the joint of the refrigerant tubing from the tank, and remove the tank.

Installation. Install the tank as follows:

(1) Be sure dry nitrogen is flowing through the system, then position the tank and braze the joint of the refrigerant tubing to the tank.

(2) Temporarily support the tank and leak test the entire refrigeration system in accordance with paragraph 5-10; repair brazed joints as necessary.

(3) Install six blind rivets to attach the top front angle bracket on the tank to the bottom panel of the casing.

(4) Install four blind rivets to attach the ends of the bottom rear angle bracket on the tank to the upper back panel of the casing.

(5) Install the tank baffle, and install four round head and four countersunk blind rivets to attach it to the upper back panel of the casing.

(6) Install the two screws and lock washers that attach the front of the evaporator fan motor mounting bracket to the bottom panel of the casing.

(7) Refer to paragraph 4-15.e. and figure 4-12 and install the top panel on the cabinet.

(8) Install the fresh air filter element, the fresh air filter mounting frame, and the seven attaching screws and lock washers.

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

(9) Replace the dehydrator and leak test the dehydrator flare fittings in accordance with paragraph 5-24.

. Reassembly. Reassemble the air conditioner as follows:

(1) Install the conditioned air filter, the filter retaining bracket, and the five attaching screws and washers.

(2) Install the evaporator intake grille, and the 12 attaching screws and washers.

(3) Install the front fresh air damper control knob, align the setscrew with the flat on the shaft, and tighten the setscrew.

Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5-12.

Access. The service valves are located in the front right hand part of the lower section of the cabinet. T gain access to the service valves, it is only necessary to loosen the five panel fastener screws, ar remove the lower front panel.

Removal. Remove service valves as follows:

WARNING

Be sure the refrigeration system is fully discharged and purged and that dry nitrogen is flowing through the system at the rate of 1-2 cfm (0.028 - 0.057 m^3/minute) before debrazing.

(1) Remove the packing nut, stem, packing, and packing washer from the valve to be remove.

(2) To remove the suction service valve, unwrap the insulation from the suction line as necessary to e pose the tubing joints with the valve body.

(3) Debraze the joints of the refrigerant tubing from the valve body, and remove the valve body.

Installation. Install service valves as follows:

(1) Disassemble the packing nut, stem, packing, and packing washer from the valve body.

(2) Be sure dry nitrogen is flowing through the system before installing the suction service valve; co nect the nitrogen hose to the valve body and start a flow before installing the discharge servi valve.

(3) Position the valve and braze the joints of the refrigerant tubing to the valve body.

(4) Install the packing washer, packing, stem, and packing nut in the valve body.

(5) Leak test the entire refrigeration system in accordance with paragraph 5-10; repair brazed joints necessary.

(6) If the suction service valve was replaced, rewrap the insulation on the suction line and secure wi the appropriate tape.

CAUTION

Always replace the dehydrator after each time the refrigeration pressure system has been opened.

(7) Replace the dehydrator and leak test the dehydrator flare fittings in accordance with paragrap 5-24.

Reassembly. The only reassembly necessary is to install the lower front panel and tighten the five pan fastener screws.

Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 and 5-12.

lengths, and shapes, and a number of elbows, tees and adapters in several sizes. Observe th
replacing any piece of tubing or fitting in the system:

WARNING

Be sure the refrigeration system if fully discharged and purged, and that dry nitrogen i
through the system at a rate of 1-2 cfm (0.028 - 0.057 m^3/minute) before brazing or d

a. Replace tubing and fittings only with equal material, grade, size, length, and shape as t

b. Leak test the entire refrigeration system in accordance with paragraph 5-10 after any re
that required brazing.

c. Replace the dehydrator and leak test the dehydrator flare fittings as the final step in a
action that required the refrigeration pressure system to be opened.

d. Evacuate and charge the refrigeration system in accordance with paragraphs 5-11 a
other maintenance actions are completed.

Section/Paragraph
air Parts, Special Tools, TMDE, and Support ipment I
eneral 6-1
horized General Support Maintenance Actions II
General .....
Casing Insulation .....
Lifting Fittings .....
Base Assembly .....

Section I

REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

-1. GENERAL

air parts are listed and illustrated in TM 5-4120-363-24P. No special tools are required for general sup ntenance of the air conditioner. Test, maintenance, and diagnostic equipment (TMDE), and support eq nt, includes standard electrical test equipment, and standard pressure and vacuum gages, vacuum pu l servicing manifolds found in any general support maintenance refrigeration facility.

Section II

AUTHORIZED GENERAL SUPPORT MAINTENANCE ACTIONS

-2. GENERAL

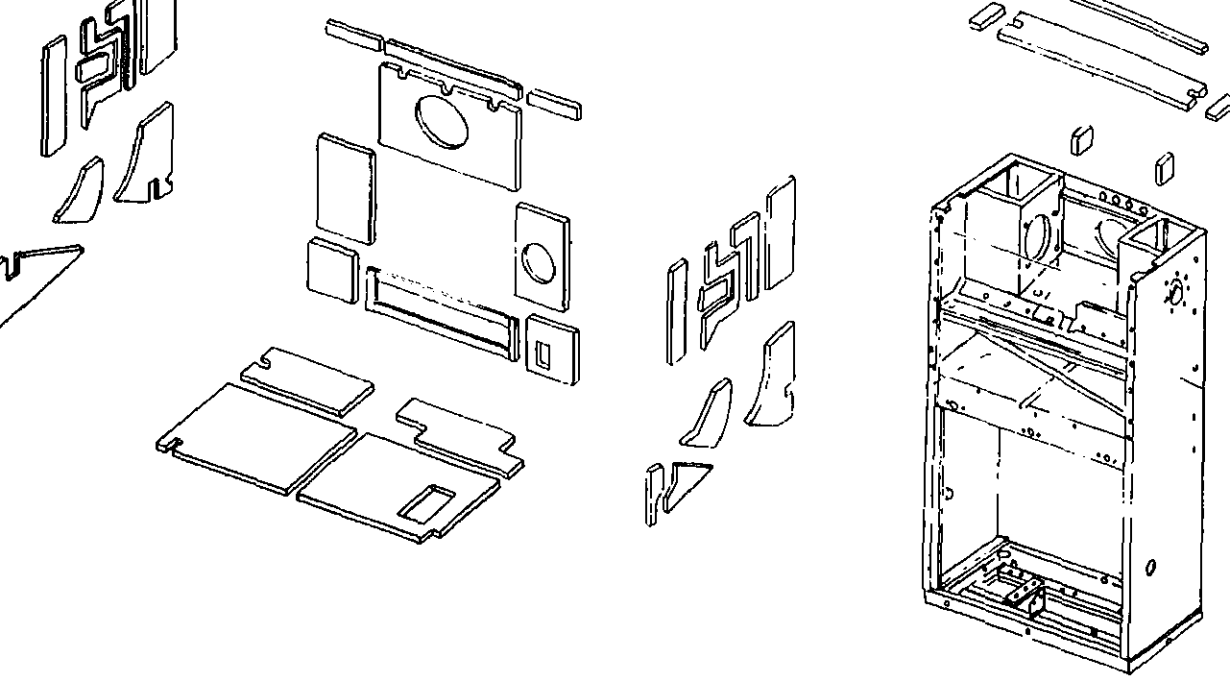
only items restricted to general support maintenance level by the Maintenance Allocation Chart (MAC repair or replacement of insulation or lifting fittings on the casing, and replacement of the cabinet b vever, general support maintenance may be called upon, at times, to perform any or all of the MAC i ed for organizational and direct support maintenance for rehabilitation or overhaul of an air conditio

-3. CASING INSULATION

. Description. Insulation is provided on the inside of all exterior surfaces of the evaporator section c casing (except for the evaporator intake and discharge grilles) and on the top of the dividing casing tition between the evaporator and condenser sections. The purpose of this insulation is to minimize gain/loss from the room or enclosure air recirculated through the evaporator section, and to supp noise transmission associated with high volume air flow. All insulation in the evaporator section con of polyurethane foam material conforming to MIL-I-14511. Each piece of insulation is glued to the ca surface with adhesive conforming to MMM-A-1617, Type II. In addition adhesive-sealant, Silicone general purpose, Type I, conforming to MIL-A-46106 is used to seal all cracks between the casing panels and the partition between the evaporator and condenser sections.

. Removal. At manufacture, insulation is installed in the casing prior to assembly of mechanical, electr and refrigeration system components. Complete removal of all insulation requires almost comp disassembly of the entire air conditioner. Remove insulation as follows:

(1) Disassemble mechanical, electrical, and refrigeration components as necessary to expose



TS-4120-363-1/6-1

Figure 6-1. Insulation

(2) Use a putty knife, or similar tool, to scrape and peel off as much of the old insulation as possible. careful not to scratch the protective finish on the metal surfaces of the casing.

WARNING

Acetone and methyl-ethyl-ketone (MEK) are highly flammable and their vapors are potentially explosive. Prolonged or repeated inhalation of fumes or contact with the skin can produce toxic effects. Wear protective gloves and use only in a well ventilated area, well away from sparks or open flame.

(3) Soften remaining insulation and adhesive with acetone or MEK and scrape with a putty knife. Rep softening and scraping as necessary. Wipe clean with a cloth dampened with acetone or MEK.

Installation. Cut replacement insulation pieces from a sheet of bulk material. Trim and shape to fit surface on which it is to be attached and install as follows:

(1) Brush an even coating of adhesive on both the attaching side of the insulation and the metal surfa of the casing.

(2) Allow adhesive to air dry until it has a tacky feeling but does not stick to the fingers.

Description. A lifting fitting is provided in the top center of each side panel of the air conditioner casin The purpose of these fittings is to provide a means for attaching a sling so that the air conditioner can handled with an overhead hoist.

Removal. Each lifting fitting is attached to the side panel of the casing by eight blind rivets. To remov drill out the rivets and remove the fitting.

Installation. To install, position the fitting and install eight blind rivets.

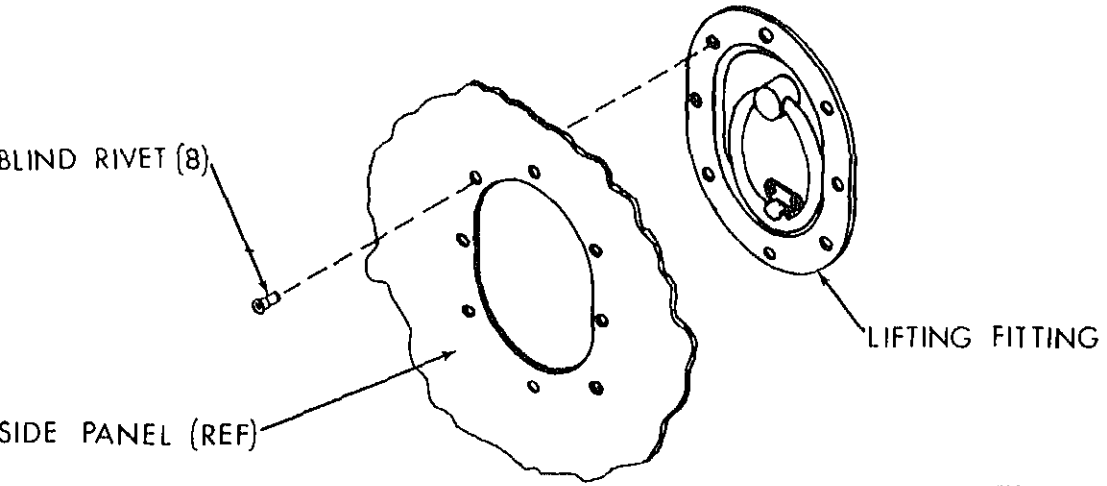


Figure 6-2. Lifting Fitting

BASE ASSEMBLY See figure 6-3.

Description. The base assembly is a weldment that forms the bottom of the air conditioner cabinet. T base also serves as a condensate evaporation pan if an external drain line is not installed. Six rivnuts a provided in the upper horizontal surface of the base at each side for the screws that attach the si panels of the casing. Six rivnuts are provided in the vertical rear surface of the base for the screws th attach the lower back panel. Four rivnuts, arranged in two pairs, are provided in the upper horizontal su face near the front center of the base; the pair nearest the front are for the two screws that attach t bracket on the lower right hand side of the junction box; the other pair are for the screws that attach t bracket on which the quench and pressure equalizer solenoid valves are mounted. A single rivnut is pr vided in the upper horizontal surface near the left rear corner of the base for the screw that attaches loop clamp that holds a section of refrigerant tubing. A hole, equipped at manufacure with a clinch nut the upper horizontal surface, is provided near each of the four corners of the base for anchoring pu poses. Four holes are provided in the upper horizontal surface in the right hand side of the base for t compressor mounting bolts. Two drain holes, threaded for standard pipe fittings are provided in the ver cal surface at each side of the base; plugs are installed in all four holes at manufacture.

Removal. Except for the weight of the compressor, and the difficulty in reaching some of the attachi hardware, the casing with all components installed could be lifted off the base. The recommend method for removal of the base assembly is as follows:

(1) Refer to paragraph 5-28 and figure 5-15 and remove the compressor.

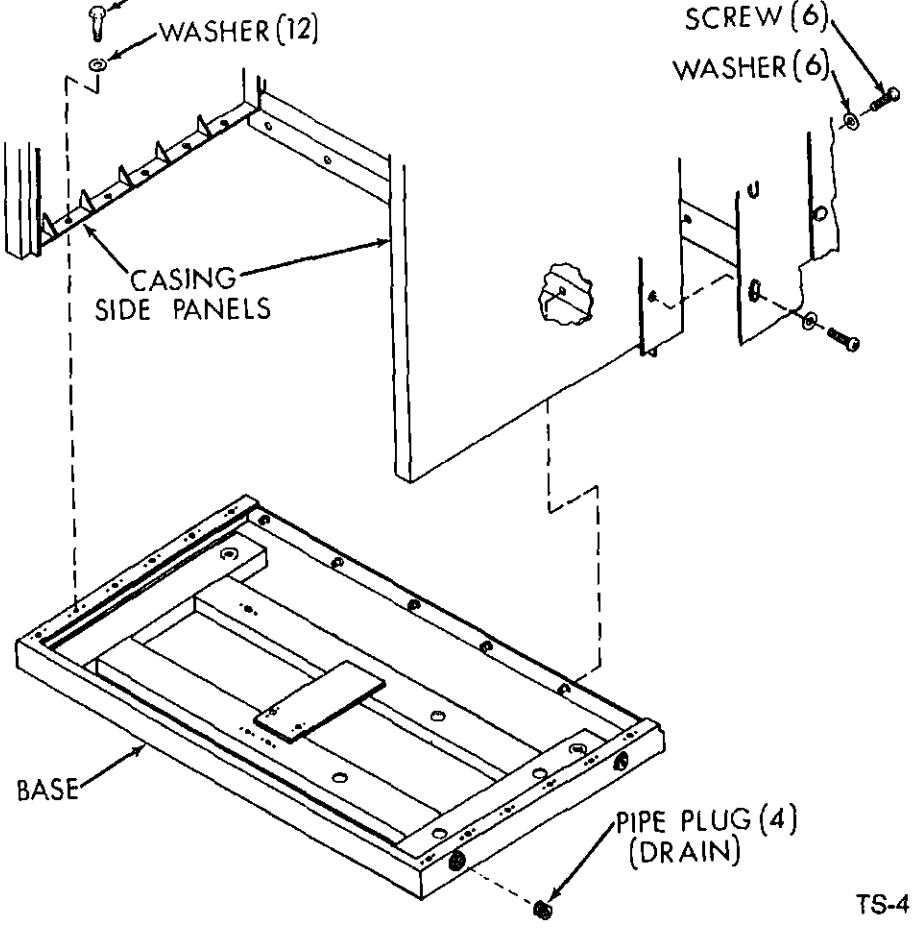


Figure 6-3. Base Assembly

(3) Remove the six screws and washers that attach the lower back panel and fabric cover to

(4) Remove the six screws and washers that attach each side panel of the casing to the ba

(5) Remove the two screws that attach the mounting bracket for the quench and pressure solenoid valves to the base.

(6) Remove the screw and washer that attach the loop clamp on the refrigerant line to the

(7) Use a sling and spreader bar attached to an overhead hoist and lift the air conditioner of

c. Installation. Install the base assembly as follows:

(1) Use a sling and spreader bar attached to an overhead hoist to lower the air conditione base.

(6) Refer to paragraph 4-25 and figure 4-24 and install the junction box.

(7) Refer to paragraph 5-27 and figure 5-14 and install the compressor.

APPENDIX A

REFERENCES

A-1.	FIRE PROTECTION	
	TB 5-4200-200-10	Hand Portable Fire Extinguishers Approved for Army User
A-2.	LUBRICATION	
	C91001L	Fuels, Lubricants, Oil and Waxes
A-3.	PAINTING	
	TM 43-0139	Painting Instructions for Field Use
A-4.	MAINTENANCE	
	DA Pam 738-750	The Army Maintenance Management System (TAMMS)
	TM5-4120-363-24P	Organizational, Direct Support and General Support Maintenance Repair Parts and Special Tools List
A-5.	CLEANING	
	Fed. Spec P-D-680	Dry cleaning solvent
A-6.	DESTRUCTION	
	TM 750-244-3	Procedures for Destruction of Equipment to Prevent Enemy Use
A-7.	SHIPMENT AND STORAGE	
	TM 740-90-1	Administrative Storage of Equipment
A-8.	RADIO SUPPRESSION	
	TM 11-483	Radio Interference Suppression
A-9.	TESTING	
	TM 9-4940-435-14	Leak Detector, Refrigerant Gas

Section I. INTRODUCTION

-1. SCOPE

s appendix lists Integral Components of and Basic Issue Items (BII) for the Air Conditioner to help entory items required for safe and efficient operation.

-2. GENERAL

s component of End Items List is divided into the following sections.

a. Section II. Integral Components of the End Item.

ese items, when assembled, constitute the Air Conditioner and must accompany it whenever it is transfe turned in. These illustrations will help you identify these items.

b. Section III. Basic Issue Items.

ese are minimum essential items required to place the Air Conditioner in operation, to operate it and to m emergency repairs. Although shipped separately packed, they must accompany the Air Conditioner operation and whenever it is transferred between accountable officers. The illustrations will assist you d-to-identify items. This manual is your authority to requisition replacement BII based on Table(ganization and Equipment (TOE)/Modification Table of Organization and Equipment (MTOE) authoriz the end item.

-3. EXPLANATION OF COLUMNS

a. Illustration: This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration on which the item is show applicable).

(2) Item Number. The number used to identify item called out in the illustration.

b. National Stock Number (NSN): Indicates the national stock number assigned to the end item whic be used for requisitioning.

c. Part Number (P/N): Indicates the primary number used by the manufacturer which controls the de and characteristics of the item by means of its engineering drawings, specifications, standards inspection requirements to identify an item or range of items.

d. Description: Indicates the federal item name and, if required, a minimum description to identify the

e. Location: The physical location of each item listed is given in this column. The lists are design inventory all items in one area of the major item before moving on to an adjacent area.

f. Usable on Code: "USABLE ON" codes are included to help you identify which component items are on the different models. Identification of the codes used in this list are:

CODE	USED ON

h. Quantity: This column is left blank for use during inventory. Under the received column, list the quantity you actually receive on your major item. The date columns are for use when you inventory the major item at a later date, such as for shipment to another site.

(1) TRATION (b) ITEM NO.	(2) NATIONAL STOCK NUMBER	(3) PART NO. & FSCM	(4) DESCRIPTION	(5) LOCATION	(6) USABLE ON CODE	(7) QTY REQD	(8) QUANTITY RCVD	DATE	DATE	DATE
			Section II INTEGRAL COMPONENTS OF END ITEM							
7		13218E9963	Control Panel (Remote)			1				
3		13214E3937	Inlet Air Grille			1				
9		13214E3931	Discharge Air Grille			1				
			Section III BASIC ISSUE ITEMS							
		5220-00-559-9618	Case, Manual							
			Department of Army Technical Manual;			1				
			Operator, Organizational, Direct Support and General Support Maintenance Manual TM5-4120-			1				

Section I. INTRODUCTION

SCOPE

-pendix lists expendable supplies and materials you will need to operate and maintain the Air Cond These items are authorized to you by CTA50-970, Expendable Items (except Medical, Class V, Repa nd Heraldic Items).

EXPLANATION OF COLUMNS

olumn 1 — Item Number. This number is assigned to the entry in the listing and is referenced in th arrative instructions to identify the material (e.g., "Use cleaning compound, Item 5, App. D").

olumn 2 — Level. This column identifies the lowest level of maintenance that requires the listed Iten nter as applicable):

— Operator/Crew
— Organizational Maintenance
F — Direct Support Maintenance
H — General Support Maintenance

olumn 3 — National Stock Number. This is the National stock number assigned to the item; use it f equest or requisition the item.

olumn 4 — Description. Indicates the Federal item name and, if required, a description to identify th em. The last line for each item indicates the part number followed by the Federal Supply Code fo lanufacturer (FSCM) in parentheses, if applicable.

olumn 5 — Unit of Measure (U/M). Indicates the measure used in performing the actual maintenanc unction. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If th nit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy you equirements.

Section II

EXPENDABLE SUPPLIES AND MATERIALS LIST

) M BER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
	O	4130-00-860-0042	Coater, Air Filter, 1 pint container	ea
	F	8040-00-664-4318	Adhesive, 1 pint container	ea
	F		Tape PPP-T-60 Type IV 1" wide (81348)	rl

Section I — INTRODUCTION

GENERAL

his section provides a general explanation of all maintenance and repair functions authorized arious maintenance levels.

he Maintenance Allocation Chart (MAC) in Section II designates overall responsibility for the perfor nce of maintenance functions on the identified end item or component. The implementation of the ma enance functions upon the end item or component will be consistent with the assigned maintenar unctions.

ection III lists the special tools and test equipment required for each maintenance function eferenced from Section II.

ection IV contains supplemental instructions on explanatory notes for a particular maintenance fu on.

MAINTENANCE FUNCTIONS

nspect. To determine the serviceability of an item by comparing its physical, mechanical and lectrical characteristics with established standards through examination.

est. To verify serviceability and detect incipient failure by measuring the mechanical or electri haracteristics of an item and comparing those characteristics with prescribed standards.

ervice. Operations required periodically to keep an item in proper operating condition, i.e., to clean (ontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or co ressed air supplies.

djust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting perating characteristics to specified parameters.

line. To adjust specified variable elements of an item to bring about optimum or desired performan

alibrate. To determine and cause corrections to be made or to be adjusted on instruments or t easuring and diagnostic equipments used in precision measurement. Consists of comparisons of t nstruments, one of which is a certified standard of known accuracy, to detect and adjust a iscrepancy in the accuracy of the instrument being compared.

nstall. The act of emplacing, seating, or fixing into position an item, part, or module (component or embly) in a manner to allow the proper functioning of an equipment or system.

eplace. The act of substituting a serviceable like type part, subassembly, or module (component or embly) for an unserviceable counterpart.

epair. The application of maintenance services (inspect, test, service, adjust, aline, calibrate, eplace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, esurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, ailure in a part, subassembly, module (component or assembly), and item, or system.

haul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipmer like new condition in accordance with original manufacturing standards. Rebuild is the highest deg material maintenance applied to Army equipment. The rebuild operation includes the act of returni zero those age measurements (hours/miles, etc.) considered in classifying Army e ments/components.

D-3. COLUMN ENTRIES

Columns used in the maintenance allocation chart will be limited to those shown. Entries for those column explained below.

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify compon assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemb subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item list column 2. (For detailed explanation of these functions, see paragraph D-2.)

d. Column 4, Maintenance Level. Column 4 specifies, by the listing of a "work time" figure in the appr ate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in colu This figure represents the active time required to perform the maintenance function at the indicated of maintenance. If the number or complexity of the tasks within the listed maintenance function va different maintenance levels, appropriate "work time" figures will be shown for each level. The numb man-hours specified by the "work time" figure represents the average time required to restore an (assembly, subassembly, component, module, end item, or system) to a serviceable condition. The bol designations for the various maintenance levels are as follows:

C ..... Operator or crew
O ..... Organizational maintenance
F ..... Direct support maintenance
H ..... General support maintenance
D ..... Depot maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not indiv tools) and special tools, test, and support equipment required to perform the designed function.

f. Column 6, Remarks. Column 6 contains a letter code in alphabetical order which shall be keyed t remarks contained in Section IV.

D-4. COLUMN ENTRIES USED IN TOOL AND TEST EQUIPMENT REQUIREMENTS

a. Column 1, Tool or Test Equipment Reference Code. The tool and test equipment reference code c lates with a maintenance function on the identified end item or component.

b. Column 2, Maintenance Level. The lowest level of maintenance authorized to use the tool or test e ment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

-nce Code. The code scheme recorded in column 6, Section II.

rks. This column lists information pertinent to the maintenance function being performed as indi-
on the MAC, Section II.

MAINTENANCE ALLOCATION CHART

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools & Equipment
01	CASING COVERS, PANELS, GRILLES, SCREENS, AND INFORMATION PLATES							
	Covers	Inspect	0.1					
		Service		0.2				
		Repair			2.0			
		Replace			0.5			
	Panels	Inspect	0.1					
		Service		0.1				
		Repair			2.0			
		Replace			0.5			
	Grilles	Inspect	0.1	0.1				
		Adjust	0.1					
		Service	0.2	0.1				
		Repair		0.1	2.0			
		Replace			0.5			
	Screens	Inspect	0.1					
		Service	0.1	0.1				
		Replace			0.5			
	Information Plates	Inspect	0.1					
		Service	0.1					
		Replace			0.2			
02	AIR CIRCULATING AND CONDENSATE DRAIN SYSTEM							
	Fresh Air Damper	Adjust	0.1					
		Service		0.5				
		Repair		1.0				
		Replace		1.0				
	Air Filters	Inspect		0.5				
		Service		1.0				
		Replace		0.5				
	Mist Eliminator	Inspect		0.5				
		Service		1.0				
		Replace		0.5				

(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools & Equipment	(6) Remarks
Condensate Trap	Inspect		0.5					
	Service		1.0					
	Replace		0.7					
ELECTRICAL								
Control Panel	Inspect	0.1						
	Adjust	0.1						
	Test		1.0					
	Repair		2.0					
	Replace		1.0					
Junction Box (Include RFI filter and Transformer	Inspect		0.5					
	Service		0.2					
	Test		2.0					
	Repair		4.0					
	Replace		2.0					
Wiring Harness	Inspect		1.0					
	Test		1.0					
	Repair		2.0					
	Replace		4.0					
EVAPORATOR FANS, MOTOR AND HEATERS								
Motor	Inspect		1.0					C
	Service		0.1					
	Test		0.2					
	Repair			2.0				
	Replace		1.0					
Fans	Inspect		1.0					
	Service		0.1					
	Replace		1.0					
Heater Thermostat	Inspect		1.0					
	Test		0.3					
	Replace		0.5					
Heater Element	Inspect		1.0					
	Test		0.3					
	Replace		1.0					
CONDENSER FAN MOTOR AND RACK								

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools & Equipment
	Fan	Inspect	0.1					
		Service		0.3				
		Replace		1.0				
	Motor	Inspect		1.0				
		Test		0.2				
		Repair			5.0			
		Replace		3.0				
	Back Panel and Motor Support	Inspect		0.5				
		Replace		4.0				
06	REFRIGERATION SYSTEM							
	Evaporator Coil	Inspect		1.0				
		Service		2.0				
		Replace			10.0			
	Expansion Valves	Test			1.0			
		Adjust			4.0			
		Replace			8.0			
	Solenoid Valves	Test			1.0			
		Repair			2.0			
		Replace			8.0			
	Liquid Indicator	Inspect	0.1					
		Service	0.1					
		Replace			8.0			
	Dehydrator	Inspect			1.0			
		Replace			8.0			
	Pressure Switches	Test			1.0			
		Adjust			1.0			
		Replace			6.0			
	Condenser Coil	Inspect		1.0				
		Service		2.0				
		Replace			10.0			
	Pressure Regulating Valve	Test			0.5			
		Adjust			0.5			
		Replace			8.0			

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools & Equipment	(6) Remarks
	Tubing and Fittings	Test			2.0				
		Replace			8.0				
	CASING AND BASE								
	Casing	Inspect				0.5			
		Repair				1.0			F
		Replace				1.0			F
	Base	Inspect				0.2			
		Replace				10.0			

APPENDIX D

Section III.

TOOL AND TEST EQUIPMENT REQUIREMENTS

MAINTENANCE ALLOCATION CHART

(1) Group Number	(2) Maintenance level	(3) Nomenclature	(4) National/NATO stock number	(5) Tool number
		No special tools and test equipment required. Standard tools and test equipment in the following kits are adequate to accomplish the maintenance functions listed in Section II:		
		Tool kit, service, refrigeration Unit (SC 5180-90-CL-N18)	5180-00-597-1474	

REMARKS

MAINTENANCE ALLOCATION CHART

Reference code	REMARKS
A	Replace gasket and insulation only
B	Replace gasket only
C	Replace bearings and electrical connectors only
D	Replace coil only
E	Replace external components only
F	Replace insulation and lifting handles only
	Other than those items listed above there are no supplemental instructions or explanatory remarks required for the maintenance functions listed in Section All functions are sufficiently defined in Section I. Active time listed for maintenance task functions are with the air conditioner in off-equipment posi

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J. C. PENNINGTON
Major General, United States Army
The Adjutant General

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36,000 BTU/HR, Compact.

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6	2-1 a			In line 6 of paragraph 2-1a th manual states the engine has 6 cylinders. The engine on my sec only has 4 cylinders. Change the manual to show 4 cylinder
81		4-3		Callout 16 on figure 4-3 is pointi at a bolt. In the key to fig. 4-3, item 16 is called a shim. Please correct one or th other.
125	line 20			I ordered a gasket item 19 on figure 2 got. Supply ordered. Please giv

SAMPLE

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1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 s
1 sq. decimeter = 100 sq. centimeters = 15.5 sq
1 sq. meter (centare) = 100 sq. decimeters = 10
1 sq. dekameter (are) = 100 sq. meters = 1,076.
1 sq. hectometer (hectare) = 100 sq. dekameter
1 sq. kilometer = 100 sq. hectometers = .386 sq

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu
1 cu. decimeter = 1000 cu. centimeters = 61.02
1 cu. meter = 1000 cu. decimeters = 35.31 cu. f

Approximate Conversion Factors

To change	*To*	*Multiply by*
inches	centimeters	2.540
feet	meters	.305
yards	meters	.914
miles	kilometers	1.609
square inches	square centimeters	6.451
square feet	square meters	.093
square yards	square meters	.836
square miles	square kilometers	2.590
acres	square hectometers	.405
cubic feet	cubic meters	.028
cubic yards	cubic meters	.765
fluid ounces	milliliters	29,573
pints	liters	.473
quarts	liters	.946
gallons	liters	3.785
ounces	grams	28.349
pounds	kilograms	.454
short tons	metric tons	.907
pound-feet	newton-meters	1.365
pound-inches	newton-meters	.11375

To change	*To*
ounce-inches	newton-meters
centimeters	inches
meters	feet
meters	yards
kilometers	miles
square centimeters	square inches
square meters	square feet
square meters	square yards
square kilometers	square miles
square hectometers	acres
cubic meters	cubic feet
cubic meters	cubic yards
milliliters	fluid ounces
liters	pint
liters	
liters	
grams	
kilograms	
metric tons	

Temperatur

°F	Fahrenheit temperature	5/9 (after subtracting 32)